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MSGID/GENADMIN/NAVY CRANE CENTER//

SUBJ/CHANGE 1 TO NAVFAC P-307//

REF/A/DOC/NAVFAC P-307/01SEP2000//

REF/B/MSG/NAVCRANECEN LESTER PA/081601ZAUG2001//

REF/C/MSG/NAVCRANECEN LESTER PA/191601ZNOV2001//

NARR/REF A IS MANAGEMENT OF WEIGHT HANDLING EQUIPMENT. REF B IS CLARIFICATION OF CRANE ALTERATION REQUEST PROCEDURES. REF C IS ADVANCE CHANGE NOTICE TO NAVFAC P-307.//

POC, -/NAVY CRANE CENTER/LOC:LESTER PA/TEL:DSN 443-0505 /TEL:COMM. 610-595-0951/

RMKS/1. THE PURPOSE OF THIS MESSAGE IS TO ANNOUNCE CHANGE 1 TO REF A. REFS B AND C HAVE BEEN REVISED AND INCORPORATED INTO CHANGE 1 AND ARE HEREBY CANCELLED.

2. THE FULL TEXT OF CHANGE 1 CAN BE DOWNLOADED FROM NCC'S WEB SITE, WWW.NCC.NAVFAC.NAVY.MIL. A SYNOPSIS OF CHANGES IS INCLUDED.

3. SOME OF THE CHANGES REFLECT REQUIREMENTS THAT ARE MODIFIED OR DELETED WITHOUT AFFECTING EQUIPMENT SAFETY OR RELIABILITY. SIGNIFICANT CHANGES WERE MADE TO THE OPERATOR'S PRE-USE CHECK (SECTION 9). A COMPLETE PRE-USE CHECK IS NOW REQUIRED ONCE PER DAY (VICE ONCE PER SHIFT). AFTER THE INITIAL PRE-USE CHECK, SUBSEQUENT OPERATORS WILL PERFORM AN ABBREVIATED OPERATIONAL CHECK AND SIGN THE INITIAL OPERATOR'S DAILY CHECKLIST. LOWER LIMIT SWITCH CHECKS ON HOOK HOISTS (AS OPPOSED TO BOOM HOISTS) WILL NOT BE REQUIRED IF THERE ARE SUFFICIENT WIRE ROPE WRAPS REMAINING ON THE DRUM (TWO FOR GROOVED DRUMS, THREE FOR SMOOTH DRUMS) WHEN THE HOOK IS LOWERED TO ITS LOWEST POSSIBLE POSITION. OTHER DELETIONS OF NON VALUE-ADDED REQUIREMENTS INCLUDE INTERNAL GEAR VISUAL INSPECTIONS AND OIL/VIBRATION ANALYSES FOR HYDRAULIC MOBILE CRANES AND CATEGORY 3 PACKAGE HOISTS. ALSO, THE WIRE ROPE TEST FOR PORTAL CRANES WILL NOW BE A ONE-TIME TEST (VICE ANNUAL) AND CERTAIN MOBILE CRANE LOAD TESTS HAVE BEEN ELIMINATED. ONE IMPORTANT NEW REQUIREMENT ADDRESSES QUALITY CONTROL OF PRIVATE VENDORS WHO PERFORM NONDESTRUCTIVE TESTING AND SOME CONTRACTOR CRANE REQUIREMENTS HAVE BEEN STRENGTHENED.

4. ACTIVITIES SHALL HAVE ONE YEAR FROM THE DATE OF THIS NOTIFICATION TO BE IN FULL COMPLIANCE WITH THIS CHANGE.//

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U N C L A S S I F I E D

Pg 1

SYNOPSIS FOR CHANGE 1 TO SEPTEMBER 2000 NAVFAC P-307

Paragraph 1.7.2.c Deleted "Effective 1 October 2001" from first sentence.

Paragraph 1.7.2.e Changed critical lift threshold from 80 percent to 75 percent to agree with Army Corps of Engineers manual EM-385-1-1.

Paragraph 1.7.2.f and 1.7.2.g Incorporated and clarified advanced change notice 1 (ACN1). Clarified WHE accident notification and reporting requirements for contractors. New paragraph "g."

Paragraph 1.7.2.g Deleted paragraph. The requirements of all subparagraphs of paragraph 1.7.2 must be included in NAVFAC construction contracts. Former paragraph "g."

Paragraph 1.7.2.1 Incorporated and clarified ACN1. Subparagraphs added for clarity. Added requirement for retaining copies of contractor crane operation checklists. Changed requirements for WHE accident notification by the contracting officer. The host activity shall be immediately notified of all WHE accidents. Reports of all contractor WHE accidents shall be submitted to the Navy Crane Center and the host activity.

Paragraph 3.5.3 Removed multiple counterweights from ancillary equipment procedure requirements.

Paragraph 3.5.3.1 Added counterweights and outrigger extension pins.

Paragraph 4.1 Added requirements for electronic submission of Crane Alteration Requests (CAR).

Paragraph 4.2 Clarified that local approval of minor changes is made by documenting the changes on shop work documents. Addressed attaching non-load bearing/load controlling/operational safety items to load bearing or load controlling parts.

Paragraph 4.2.1 Deleted the terms "Class A," "Class B," etc. for mandatory crane alterations. Added requirement to use figure 4-2 to notify NCC of mandatory crane alteration accomplishment. Added e-mail transmission of figure 4-2 to NCC is acceptable.

Paragraph 4.3 Addressed minor changes to locally approved CAR's. Approval for minor changes is by documenting the change on shop work documents.

Paragraph 4.4.3.f (3) Substituted "load bearing or load controlling components" for "structural shapes." Added "cleaning up" small holes.

Paragraph 4.4.5.a Add NCC approval requirements for adjustments to drive parameters where the range is not provided by the OEM and for establishment of initial or new drive parameters appropriate for the crane design.

Paragraph 4.4.6.1 Add the word "Some" not all crane booms are fabricated from high-strength, low alloy tubular steel.

Figure 4-1 Changed reference drawings to references. Changed Chief Engineer to Director, In-Service Engineering including changed phone number.

Figure 4-1 Instructions Revised for clarification.

Figure 4-2 Added NCC UIC to top of form. Deleted classes of mandatory alterations. Changed timeframes for accomplishment of mandatory-delayed alterations. Added word "ORIGINAL" to "ALTERATION NUMBER" block. Added NAVSEA concurrence line for NAVSEA 04 concurrence when required by the NAVSEA 04 Crane Quality Manual. Changed Chief Engineer to Director In-Service Engineering.

Paragraph 9.1 Revised to require one complete pre-operational check at the start of use each day. Subsequent operators shall review the initial ODCL, perform the operational checks of paragraph 9.1.2.1.4, and sign the initial ODCL.

Paragraph 9.1.1 Relocated the first sentence to paragraph 9.1. Revised and relocated the last sentence (annotating unsatisfactory conditions) to paragraphs 9.3.1 and 9.3.2.

Paragraph 9.1.2 Revised for clarification. Relocated limit switch checks to paragraph 9.1.2.1.4.h.

Paragraph 9.1.2.1.1 Deleted sentence addressing crane operation. These checks are now addressed in paragraph 9.1.2.1.4.

Paragraph 9.1.2.1.1.d Deleted the sentence addressing operation.

Paragraph 9.1.2.1.1.i Deleted last two sentences. These sentences do not provide directions.

Paragraph 9.1.2.1.1.j Revised for clarification. Deleted last sentence (non-directive).

Paragraph 9.1.2.1.1.l Added bumpers.

Paragraph 9.1.2.1.1.o Revised for clarification. Deleted locking devices and track clamps.

Paragraph 9.1.2.1.1.q Added area safety check.

Paragraph 9.1.2.1.2.a Deleted second sentence (non-directive). Last sentence changed "rags" to "debris."

Paragraph 9.1.2.1.2.b Revised second sentence for clarification.

Paragraph 9.1.2.1.2.d Revised for clarification.

Paragraph 9.1.2.1.2.e Revised for clarification.

Paragraph 9.1.2.1.2.i Changed "fuel oil" to "fuel level." Revised second sentence for clarification.

Paragraph 9.1.2.1.2.k Revised for clarification.

Paragraph 9.1.2.1.3.i Added check of "Danger/Caution Tags" in the operator's cab.

Paragraph 9.1.2.1.4.b Deleted "crane stability." These are pre-lift requirements that are addressed in section 10. Added outrigger/stabilizer operational check.

Paragraph 9.1.2.1.4.d Revised for clarification. Added check of hoist controls through full speed range.

Paragraph 9.1.2.1.4.e Added wire rope check during hoist operation.

Paragraph 9.1.2.1.4.f Added clutches.

Paragraph 9.1.2.1.4.h Clarified that boom hoist primary limit switches are only checked during the initial check of the crane. Deleted requirement to check hook hoist lower limit switches where a minimum two wraps of rope remain on the drum (three wraps for ungrooved drums) when the hook is at its lowest possible position. Relocated secondary limit switch check requirements from paragraph 9.1.2.

Paragraph 9.1.2.1.4.i Revised for clarification.

Paragraph 9.1.2.1.4.l Added "where visible."

Paragraph 9.1.3 Deleted. Submission of ODCL is addressed in paragraph 9.1.

Paragraph 9.2.b Fourth sentence deleted "at the end of the shift." Deleted sentence addressing retention requirements. Retention requirements are addressed in section 5.

Paragraph 9.3.1 Provided requirements for annotating unsatisfactory conditions and for operator inspection of previously known and tagged deficiencies.

Paragraph 9.3.2 Provided requirements for annotating unsatisfactory conditions. Revised for clarification.

Figure 9-1 Revised to reflect changes made in section 9.

Paragraph 10.7 Added precautions for reaching under suspended loads.

Paragraph 10.8.2 Added requirement to operate one crane function at a time when lifting personnel.

Paragraph 14.7.1 Revised last sentence of introductory paragraph.

Paragraph 14.7.1.a Added welded links.

Paragraph 14.7.1.b Changed "links" to "weldless links"

Paragraph 14.7.1.c Changed "minimum eye section diameter shown in ASME B18.15" to "OEM's nominal eye section diameter."

Paragraph 14.7.1.f Changed "minimum" to "nominal."

Paragraph 14.7.2 Added prohibition of grinding on shackle pins where fit-up is critical.

Appendix A Added term "package hoist."

Appendix C

Item 20 Revised diesel engine sensor testing requirements.

Item 29b Deleted requirement for oil/vibration analysis or internal gear inspection of hydraulic mobile cranes.

Appendix D

Item 8b Deleted requirement for oil/vibration analysis or internal gear inspection of category 3 package hoist assemblies.

Appendix E

Paragraph 1.4.3 Added restriction on the use of certain powder blowers for magnetic particle application and removal. Added restrictions on amount of halogens and sulphur in liquid penetrants.

Paragraph 1.4.4 Added NDT quality assurance requirements.

Paragraph 1.5.4 Clarified NDT acceptance criteria. Added NDT quality assurance requirements.

Paragraphs 2.2.3.c, 2.2.4.c, and 2.2.5.c Revised to require the wire rope test for new wire rope only.

Paragraph 2.3.8 Deleted. Travel tests per paragraphs 2.2.3.k and 2.2.3.l provide sufficient testing.

Paragraph 5.5.2, Note 1 Deleted requirements for test(s) over the front or rear.

Paragraph 5.5.4 (former paragraphs 5.5.4, 5.5.5, and 5.5.6) Clarified and combined into one paragraph the requirements for testing ancillary equipment. Renumbered subsequent paragraphs.

Paragraph 5.5.5.b Deleted stability test requirements where no ratings are governed by stability.

Paragraph 5.5.7 Deleted requirements for testing intermediate outrigger settings.

Paragraph 5.6.2, Note 1 Deleted requirements for test(s) over the front or rear.

Paragraph 5.6.5 Deleted requirements for testing intermediate outrigger settings.

Appendix O Incorporated and clarified guidance provided by NCC message 081601Z AUG 01.

Appendix Q

Added ASME B18.15 and ASTM E 543 and F 1145.

contractor citing which OSHA regulations are applicable, e.g., cranes used in cargo transfer shall comply with 29 CFR 1917; cranes used in construction, demolition, or maintenance shall comply with 29 CFR 1926; cranes used in ship building, ship repair, or ship breaking shall comply with 29 CFR 1915). For cranes at naval activities in foreign countries, the contractor shall certify that the crane and rigging gear conform to the appropriate host country safety standards. The contractor shall also certify that all of its crane operators working on the naval activity have been trained not to bypass safety devices (e.g., anti-two block devices) during lifting operations. Require that the certifications be posted on the crane.

c. For mobile cranes with OEM rated capacities of 50,000 pounds or greater, require that the crane operator be designated as qualified by a source that qualifies crane operators (i.e., a union, a government agency, or an organization that tests and qualifies crane operators). Proof of current qualification shall be provided.

d. Require the contractor to certify (appendix P, figure P-1) that the crane operator is qualified and trained for the operation of the crane to be used.

e. Require a critical lift plan for each of the following lifts: lifts over 75 percent of the capacity of the crane or hoist (at any radius of lift); lifts involving more than one crane or hoist; lifts of personnel; and lifts involving non-routine rigging or operation, sensitive equipment, or unusual safety risks. The plan shall include the following as applicable:

(1) The size and weight of the load to be lifted, including crane and rigging components that add to the weight. The OEM's maximum load capacities for the entire range of the lift shall also be provided.

(2) The lift geometry, including the crane position, boom length and angle, height of lift, and radius for the entire range of the lift. Applies to both single and tandem crane lifts.

(3) A rigging plan, showing the lift points, rigging gear, and rigging procedures.

(4) The environmental conditions under which lift operations are to be stopped.

(5) For lifts of personnel, the plan shall demonstrate compliance with the requirements of 29 CFR 1926.550(g).

f. Require the contractor to notify the contracting officer as soon as practical, but not later than four hours, after any WHE accident. (See definition in section 12.) Require the contractor to secure the accident site and protect evidence until released by the contracting officer. Require the contractor to conduct an accident investigation to establish the root cause(s) of any WHE accident. Crane operations shall not proceed until cause is determined and corrective actions have been implemented to the satisfaction of the contracting officer.

g. Require the contractor to provide the contracting officer within 30 days of any accident a Weight Handling Equipment Accident Report using the form provided in section 12 consisting of a summary of circumstances, an explanation of causes(s), photographs (if available), and corrective actions taken. These notifications and reporting requirements are in addition to those promulgated by OPNAVINST 5100.23 and related claimant instructions.

The host activity shall ensure that contracts contain the above requirements, concur with the contracting officer's oversight plan (paragraph 1.7.2.1), ensure that the oversight plan is being carried out, and provide oversight of contractor accident investigations and corrective actions.

1.7.2.1 Contracting Officer Responsibilities

a. The contracting officer shall include the minimum requirements of paragraph 1.7.2 for contractor cranes in contracts, ensure compliance with contract requirements, provide oversight of contractor crane operations, and provide oversight of contractor accident investigations and corrective actions. The degree of oversight shall be based upon the risk to Government personnel and property. Appendix P, figure P-2, provides a checklist that shall be used during oversight of contractor crane operations. The host activity shall concur with the oversight plan. Copies of appendix P, figure P-2, shall be kept on file for one year.

b. The contracting officer shall notify the host activity of any WHE accident upon notification by the contractor. Additionally, the contracting officer shall notify the Navy Crane Center of an accident involving a fatality, in-patient hospitalization, overturned crane, collapsed boom, or any other major damage to the crane or adjacent property as soon as possible, preferably within 24 hours of notification by the contractor.

c. The contracting officer shall provide the Navy Crane Center and host activity a copy of every accident report, regardless of severity, upon receipt from the contractor. These requirements are in addition to any notification and reporting requirements promulgated in OPNAVINST 5100.23 and claimant instructions. When the contracting office is not in the local area, the contracting officer shall designate a local representative to ensure compliance with the above noted requirements.

1.7.3 Cranes Owned by Other Military Services and Other Government Agencies. Where Navy personnel may be exposed to crane operations of tenant commands of other military services and agencies, the host activity commanding officer shall establish and promulgate a policy to ensure the safe operation of the equipment. The policy shall include, as appropriate, requirements addressed in paragraph 1.7.2 for contractor operated cranes. For Navy personnel who operate cranes owned by other services and agencies, the training, licensing, and operational requirements of this publication apply.

1.8 Non-Applicable Equipment. This publication does not apply to WHE installed on naval vessels, including cranes on floating drydocks. Requirements for shipboard WHE are covered in applicable NAVSEA technical publications. Also excluded are specialized (non-weight handling) and personnel lifting equipment covered by NAVFAC P-300;

operational safety device, which requires a load test for verification of satisfactory work (see exceptions, below and paragraph 3.4.3). A deficiency, adjustment, alteration, etc., to one function (e.g., whip hoist) will not necessarily void the entire crane certification provided the affected function is prevented from operating. Exceeding the certified capacity in a load test of a sample crane during a Navy Crane Center WHE audit or during a third party certification will not void a current certification or validation.

3.5.1 Exception for Extension of Certification for Emergent Conditions. When an emergent or other contingent condition exists precluding the timely certification of a crane, the commanding officer of the activity using the crane, with concurrence by the certifying official, may approve in writing a temporary extension (not to exceed 45 calendar days) of the current annual certification. Authority to extend a certification shall not be delegated. Before extending the certification, the crane shall pass a complete condition inspection including functional testing through all motions at normal operating speed. Each authorization to extend a certification shall be filed in the crane's equipment history file.

Note: Navy Crane Center third party certifications will not be extended.

3.5.2 Exception for Controlled Disassembly and Re-assembly. Controlled disassembly and re-assembly of components for inspection will not void the certification under the following conditions:

- a. A written procedure is employed, prepared by the activity and approved by the certifying official and the Navy Crane Center. The procedure, in addition to step by step disassembly and re-assembly instructions, mandates in-process inspections and inspection point sign-offs and appropriate test requirements.
- b. Components shall be easily disassembled and reassembled involving only fasteners, such as pins, bolts, and cap screws. All parts of the component are visible for inspection personnel to insure re-assembly is proper.
- c. All parts disassembled, including load bearing and load controlling fasteners, are reused. No parts are replaced, except for consumable items such as cotter pins, lock wires, non-load bearing and non-load controlling fasteners, and washers.
- d. Inspection of the disassembled parts shall reveal they are still serviceable, i.e., they have experienced no detrimental deterioration.

Note: Controlled procedures, as detailed in this paragraph, are not required for the annual condition inspection of cranes addressed in paragraph 3.5.4.

3.5.3 Exception for Re-reeving of Mobile Cranes and Ancillary Equipment on Mobile Cranes. Mobile cranes are often equipped with ancillary equipment (jib, boom inserts and extensions, swing-away jib boom, power pinned fly section, etc.) and can typically be re-reeved to several different configurations

(different blocks, different parts of line, etc.). Changing the OEM's ancillary equipment configuration or re-reeving the crane will not void the annual certification when the following conditions are met:

- a. Prior to use, the OEM's ancillary equipment shall have been inspected and tested as part of the crane's annual certification. This applies to each annual certification thereafter.
- b. The annual certification shall be valid.
- c. A written procedure shall be developed by the activity to install and remove the ancillary equipment or to re-reeve the crane. This procedure shall be developed according to the OEM's instructions, this manual, and other applicable directives. The procedure shall define each configuration change, the exact sequencing for the installation and removal, and the selective inspection and operational test required after each assembly and disassembly of the ancillary system. The activity procedure and any changes shall be approved by the certifying official and the Navy Crane Center. There shall be sufficient sign-offs in the procedure to ensure critical evolutions are completed. The approved procedure shall be retained in the equipment history file and the crane operator's instructions. The procedure shall be used each time the OEM's ancillary equipment is changed out or the crane is re-reeved.
- d. All components (pins, headache ball, hook, etc.) shall be clearly marked to designate their specific location in this system. Their use shall be restricted to the specific mobile crane. Components may not be interchanged unless approved by the OEM.
- e. See section 11 for restrictions on the use of wedge sockets for wire rope end connections.
- f. For each use of the procedures, the completed procedure shall be filed in the equipment history file.

3.5.3.1 Exception for Removable Outrigger Pads, Counterweights, and Outrigger Extension Pins on Mobile Cranes. Outrigger pads, counterweights, and outrigger extension pins on mobile cranes which are designed to be removed for travel may be removed and reinstalled without written procedures and without voiding the certification. Removable outrigger pads, counterweights, and extension pins shall be uniquely identified to a specific crane or group of cranes and their use shall be restricted to those cranes. OEM instructions shall be followed when removing or installing outrigger pads, counterweights, and outrigger extension pins.

3.5.4 Exception for Continuance for Productive Service. The intent of this section is to optimize crane availability for productive service, provided no deficiencies that could cause an unsafe condition are found during inspections or load test. Crane availability is greatly enhanced when the current annual certification remains in effect. Continuance of the annual certification is achievable by scheduling the inspections and

SECTION 4 CRANE ALTERATIONS

4.1 Crane Alteration Request Form. Alterations shall be documented using the Navy Crane Center "Crane Alteration Request" (CAR) form. (See figure 4-1.) The form is designed for facsimile transmission without a cover page and, with enclosures and signatures, shall be the official document. CAR's submitted to Navy Crane Center electronically will be accepted without signatures, but the names of the preparer, reviewer, and chief crane engineer (where applicable) must be filled in. The submitting activity will be responsible for instituting the administrative controls over this process.

4.2 Navy Crane Center Approved Alterations. Except as noted, crane alterations to load bearing parts, load controlling parts, or operational safety devices shall be approved by the Navy Crane Center. For definitions of load bearing parts, load controlling parts, or operational safety devices, see section 1. Alteration requests shall be fully developed by the activity engineering organization. Where practicable, concurrence shall be obtained from the crane or component OEM. Requests for approval shall fully describe the proposed alteration and shall include, as appropriate, specifications, design computations, drawings, and bills of material. Alterations approved by the Navy Crane Center may be revised, for reasons such as machining details or other minor changes, with local engineering approval, by recording the change on shop work documents. Alterations conditionally approved by the Navy Crane Center need not be resubmitted for approval if the activity accepts and incorporates all Navy Crane Center comments. Acceptance and incorporation of the Navy Crane Center comments will be documented on all shop work documents. See appendix O for additional guidance on crane alteration requests and Navy Crane Center review policy.

The addition of components that are not load bearing, load controlling, or operational safety devices, but are mounted to load bearing or load controlling parts, other than crane booms, may be treated as a locally approvable alteration provided that parts are attached by either drilling small holes and fastening or welding per American Welding Society procedures or Navy equivalents.

Note: The Navy Crane Center maintains records of all approved crane alterations. These can be made available to activities planning alterations.

4.2.1 Mandatory Crane Alterations. Alterations identified as mandatory are those that shall be accomplished on all cranes specified. They are classified as follows:

- a. **Mandatory-Now**: Crane(s) shall be removed from service until alteration is completed.
- b. **Mandatory-Delayed**: The time to accomplish will be specified, e.g., within 90 days. Until that time, the crane may remain in service.
- c. **Mandatory-When Needed**: This type of alteration previously corrected a deficiency on a particular crane or component. The same alteration shall be made should a similar deficiency occur on an identical crane or component.

d. Mandatory-Site Specific: Approved as a unique alteration for an activity or a particular crane. These can be due to environmental concerns or specific working conditions.

Figure 4-2 will be used by the Navy Crane Center to issue mandatory alterations. Activities shall provide notification of completion of the alteration to the Navy Crane Center upon accomplishment by using figure 4-2. E-mail or facsimile transmission is acceptable.

4.2.2 Standing Crane Alterations. Standing alterations issued by the Navy Crane Center are broad in scope, voluntary, and pertain to all cranes where applicable. Examples are fastener substitutions, wire rope substitutions, and replacement of hydraulic hose assemblies. For a current list of standing alterations, contact the Navy Crane Center.

4.3 Locally Approved Crane Alterations. Changes to WHE not involving load bearing parts, load controlling parts, or operational safety devices and not subject to further restrictions listed below, may be approved locally. Locally approved alterations shall be developed by the appropriate engineering organization, fully describing the proposed change, and shall be accompanied as necessary by specifications, design computations, drawings, and bills of material. Locally approved alterations may be in the form of shop work documents but shall have a Navy Crane Center "Crane Alteration Request" cover sheet. Locally approved alterations shall be forwarded to the Navy Crane Center for information within 14 days after approval. The Navy Crane Center will reclassify and return locally approved crane alteration requests that do not comply with the requirements of this paragraph. The returned request will identify additional documentation or action required. Alterations approved locally may be revised, for reasons such as machining details or other minor changes, with local engineering approval, by recording the change on shop work documents.

4.3.1 Alterations Based on Prior Navy Crane Center Approval. Alterations to load bearing parts, load controlling parts, and operational safety devices previously approved by the Navy Crane Center for a particular crane at an activity may be approved locally for the same alteration on identical cranes at the activity.

4.4 Additional Requirements and Exemptions

4.4.1 Changes to OEM's Rated Capacity. A change to the OEM's published or posted rated capacity constitutes an alteration as follows:

4.4.1.1 Equipment Related Changes. A change to the OEM's rated capacity due to deterioration or deficiencies of load bearing parts, load controlling parts, or safety devices is prohibited. Down rating due to discovered errors in the original design will be considered by the Navy Crane Center on a case-by-case basis.

4.4.1.2 Environmental, Administrative, and Operational Related Changes. A reduction to the OEM's rated capacity based on adverse operating conditions, such as limits in foundations or supports, track or soil conditions, or operational hazards, such as mobile

cranes on barges, may be locally approved. Also, administrative down rating for operational efficiency (e.g., the crane's full lifting capacity is not required) may be locally approved. However, there shall be documentation on file that the crane had previously been tested and certified to the OEM's rated capacity for its current reeving and configuration. Re-rating a crane, down rated per this paragraph, up to its OEM rated capacity may be locally approved.

4.4.2 Replacement parts. The following criteria are provided to determine if the use of a replacement part constitutes an alteration.

a. Interchangeability. Any replacement part identified by the OEM's part number to a single national stock number (NSN) in the Defense Logistics Information Service data base is approved as interchangeable with any other manufacturer's part number listed under the same NSN.

b. Industry Consensus Standard Equivalents. Replacement parts and hardware identified as industry consensus standard interchangeable equivalents shall be approved by the activity engineering organization. Examples are AISE brakes and mill motors, SAE grading of bolts, NEMA standard size contactors, AGMA standard geared couplings, and AFBMA standard size bearings. Examples of organizations with consensus standards are National Electrical Manufacturers' Association (NEMA), Association of Iron and Steel Engineers (AISE), Society of Automotive Engineers (SAE), Anti Friction Bearing Manufacturers' Association (AFBMA), American Gear Manufacturers' Association (AGMA), International Standards Organization (ISO), Industrial Fasteners Institute (IFI), and American National Standards Institute (ANSI).

c. Technical Bulletin. Navy Crane Center approval is not required when the crane or component OEM has issued a technical or parts bulletin or other official written notification approving the use of a specific superseding part or component in lieu of the original. The activity engineering organization shall approve the use of the superseding part.

Note: Replacement parts described above do not constitute alterations. However, these changes shall be documented either in the equipment history file, on drawings, or in the crane technical manual.

d. Fabrication to Original Specifications. When the activity holds the original crane or component OEM drawing, specification, and bill of material, they may fabricate the part or have the part fabricated to these standards. This does not constitute an alteration.

e. OEM Changes. OEM changes to load bearing parts, load controlling parts, or operational safety devices are considered alterations and require Navy Crane Center approval. OEM changes are defined as changes made by the OEM or OEM authorized agent while under contract for repair, overhaul, or remanufacture of a crane or component.

f. Approved Wire Rope End Connections. Navy Crane Center approval is not required when changing to an approved end connection as noted in section 11.

4.4.3 Repairs. Restoring a crane component or assembly to its original or virtually original condition, dimension, or mechanical property by technically recognized and accepted procedures is a repair and not an alteration. Examples are:

a. Weld repairs to other than crane booms, when performed in accordance with American Welding Society procedures or Navy equivalents. Weld repairs to hooks are not permitted.

b. Electroplating for restoring surface finish and fit.

c. Refinishing of electrical contacts.

d. Substitution of Navy Crane Center approved modern materials for obsolete materials.

e. Substitution of Navy Crane Center approved bolts/nuts for rivets and bolts of equal size.

f. Minor changes that do not effectively reduce the strength or change the function of the part, such as:

(1) Machining or grinding to remove surface defects.

(2) Machining for oversize bushings.

(3) Drilling or cleaning up small holes in load bearing or load controlling components, other than boom chord members.

(4) Removal of material for leveling of foundations.

(5) Minor repositioning of components for alignment.

g. Restoration of original interference or low clearance fits between cylindrical components (hubs and shafts) and key/keyseat assemblies using anaerobic compounds. These compounds are acceptable for restoring fits of torque transmitting assemblies only when the torque is transmitted by other means, such as a key.

Note: For a list of currently approved substitute materials, contact the Navy Crane Center (Code 04).

4.4.4 Crane Component Setting Adjustments. Adjusting component settings, such as brakes, within the OEM prescribed limits does not constitute an alteration. Adjustments using the OEM permitted replacement parts, such as stiffer brake springs, are a locally approvable alteration. Establishing brake settings and tolerances outside of OEM limits (or where the OEM does not provide a setting tolerance) for smooth stopping of travel and rotate drives (except for rotate brakes on floating cranes) is a locally approvable alteration. For hoist brakes, rotate brakes on floating cranes, and all other components, setting adjustments outside the OEM limits or the use of non-standard options or components other than what is permitted by the OEM constitutes an alteration requiring Navy Crane Center approval. Following setting adjustments, the work shall be inspected and the crane tested (and recertified if required) in accordance with section 3.

4.4.5 Alteration to Microprocessor-Controlled Cranes. An alteration request for approval shall be submitted to the Navy Crane Center for any of the following revisions to the applications program of a microprocessor-controlled crane:

- a. Changing the OEM's settings that establish new high or low limits for variables outside the OEM's recommended limits. Adjustments to drive parameters of microprocessor-controlled cranes where the range has not been provided by the crane manufacturer (OEM) as appropriate for the crane design, or establishment of initial (if not provided by the OEM) or new (outside the range established by the OEM) drive parameters appropriate for the crane design.
- b. Adding or deleting a function or device. (Navy Crane Center approval is not required when a function is temporarily deleted for testing or for an emergency situation, provided the function is restored to its original purpose and all changes are fully documented.)
- c. Installing a new function block or device.
- d. Changes affecting the firing circuits of thyristors. (Such changes shall only be made by the controller OEM.)

4.4.5.1 Exceptions. An alteration as described in paragraph 4.4.5 may be approved locally if the revisions were made by, or approved by, the controller OEM.

4.4.5.2 Testing and Recertification. Microprocessor controlled cranes shall be tested (and recertified if required) in accordance with section 3, when making a revision:

- a. As stated in the above,
- b. Affecting brake settings,
- c. Affecting torque proving, or
- d. Affecting current limit.

4.4.6 Damaged Crane Booms

4.4.6.1 Main Chord, Telescoping Boom, and Articulating Boom Damage. Any category 1 or category 4 crane, or category 3 truck mounted crane, having a damaged telescoping or articulating boom or that has a lattice type boom that has sustained structural damage to the main chords, whether tubular or structural steel shape, shall be immediately removed from service. Some booms of the newer truck, cruiser, and crawler cranes are manufactured of lightweight, thin wall, high strength low alloy tubular structural members. When the main members of these booms are damaged in any manner, including slight dents, they are severely weakened and have failed at loads significantly below rated capacity. Except as noted below for ASTM A36 steel open section members, weld repairs shall be performed by the OEM or OEM designated repair facility in accordance with OEM specifications. Alternatively, repairs may be performed by the activity if the OEM provides procedures and specifications. These repairs shall be handled as locally approved alterations.

If the OEM does not provide repair procedures, the repairs may be made if the requesting activity prepares a weld repair procedure with the approval of a qualified welding engineer and provides confirmation that the welding will be performed by a certified welder for that procedure. Weld repair procedures developed by the activity shall be submitted with an alteration request requiring Navy Crane Center approval.

Weld repairs of boom chord members made of open section ASTM A36 steel (and similar weldable mild steels) may be performed as locally approved alterations using locally developed welding procedures.

4.4.6.2 Boom Lacing Damage. Booms with lacing damage shall be removed from service until a structural inspection can be made to determine the extent of the damage. Upon inspection, the activity engineering organization shall make the determination whether to place the crane back in operation or require an immediate repair before the crane can be operated. Repairs to lacing members shall be in accordance with OEM's instructions. These repairs shall be handled as locally approved alterations.

When OEM instructions are not available, repair procedures shall be developed by the activity engineering organization and submitted with an alteration request for Navy Crane Center approval.

Weld repairs of lacing members made of open section ASTM A36 steel (and similar weldable mild steels) may be performed as locally approved alterations using locally developed welding procedures.

4.4.6.3 Testing and Recertification. Following repairs to a boom, the work shall be inspected and the crane tested and recertified in accordance with section 3.

CRANE ALTERATION REQUEST			PAGE 1 OF	
ACTIVITY		ACTIVITY WORK ORDER NUMBER		
CRANE ALTERATION TITLE		CRANE ALTERATION REQUEST NUMBER		
		NCC INFORMATION () NCC APPROVAL ()		
CRANE DESCRIPTION				
CAPACITY/TYPE	NUMBER	MANUFACTURER	SPS () GPS ()	
CRANE ALTERATION DESCRIPTION				
ASSEMBLY	SUB-ASSEMBLY	COMPONENT	PART	
REFERENCES (DRAWINGS, WEIGHT HANDLING DEFICIENCY REPORTS, ETC)				
NARRATIVE				
ACTIVITY APPROVAL / REQUEST				
PREPARER		DATE	PHONE	FAX
REVIEWER		DATE	PHONE	FAX
CHIEF CRANE ENGINEER		DATE	PHONE	FAX
DATE NCC APPROVAL NEEDED		NAVY-WIDE APPLICATION YES () NO ()		
NAVY CRANE CENTER APPROVAL				
REVIEWER		DATE	PHONE DSN 443-0505 (610) 595-0505	FAX (610) 595-0749
DIRECTOR, IN-SERVICE ENGINEERING		DATE	PHONE DSN 492-6329 (757) 492-6329	FAX (610) 595-0749
APPROVED ()	CONDITIONALLY APPROVED ()		DISAPPROVED ()	
COMMENTS ON ATTACHED CONTINUATION PAGE(S) YES () NO ()				

NAVY CRANE CENTER FORM 92-001R2 (REV. 4-02)

FIGURE 4-1 (1 of 3)

4-8

CHANGE 1 April 2002

CRANE ALTERATION REQUEST FORM INSTRUCTIONS

This form is designed for facsimile transmission without a cover page and, with enclosures and signatures, shall be the official document.

1. CRANE ALTERATION REQUEST Block - Enter total number of pages.
 2. ACTIVITY Block - A uniform name and address for activity shall be used. Reference: Plain Language Address Directory (USN PLAD 1) used for messages. Example: NAVSHIPYD PORTSMOUTH NH.
 3. ACTIVITY WORK ORDER NUMBER Block - Work authorization document number. For alterations to cranes of the same class, only the current pending work authorization number(s) is required.
 4. CRANE ALTERATION TITLE Block - A uniform system for titles shall be used. An example is: REPLACEMENT OF MAIN HOIST ELECTRIC BRAKE LININGS. First Word - Use "REPLACEMENT," "ADDITION," "REMOVAL," "REARRANGEMENT," "ALTERATION," "RETENTION" (TEMPORARY), "DOCUMENTATION (AS-BUILT VARIANCE)," "DOCUMENTATION" (MIL-HDBK 1038 VARIANCE) per NAVSEA Crane Quality Manual, chapter 2, paragraph 5.1.2 or "REPAIR OF CRANE BOOM." Second Word - Use "OF" or "TO." Third Word/Phrase - Affected assembly, sub-assembly, component, or part. Fourth Word/Phrase - Affected component or part.
 5. CRANE ALTERATION REQUEST NUMBER Block - All alteration requests, whether for NCC or local approval, shall be numbered in sequence. In the example N00102-96-001, N00102 is the activity six digit alpha-numeric Unit Identification Code (UIC) per Defense Federal Acquisition Regulation (DFAR) Supplement, 96 indicates fiscal year 1996, and 001 means the first alteration request of FY96 for this activity. Navy Crane Center issued crane alterations will use the UIC of N3258A.
 - a. Indicate if ALT is for NCC information or approval.
 6. CRANE DESCRIPTION Block - CAPACITY/TYPE, NUMBER, MFR, SPS, GPS - Self - explanatory.
 7. CRANE ALTERATION DESCRIPTION Block - An example, consistent with the example title above, is: ASSEMBLY - Main Hoist, SUB-ASSEMBLY - NA, COMPONENT - Electric Brake, PART - Linings.
 - a. REFERENCEDRAWINGS - Drawings affected by the alteration, which will be updated.
 - b. NARRATIVE - Contains fully developed alteration request and any references or enclosures.
 8. ACTIVITY APPROVAL/REQUEST Block - For locally approved alterations, line out "REQUEST." For NCC approval, line out "APPROVAL."
 - a. PREPARER, DATE, PHONE, FAX - Self-explanatory.
 - b. REVIEWER, DATE, PHONE, FAX - Self-explanatory.
 - c. CHIEF CRANE ENGINEER, DATE, PHONE, FAX - Self-explanatory.
 - d. DATE NCC APPROVAL NEEDED - Self-explanatory.
 - e. NAVY-WIDE APPLICATION - Indicate if this alteration may have applicability to cranes at other activities.
- NOTE: At least two different signatures are required in blocks 8.a, 8.b, or 8.c.
9. NAVY CRANE CENTER APPROVAL Block
 - a. REVIEWER, DATE, PHONE, FAX - Self-explanatory.
 - b. DIRECTOR, IN-SERVICE ENGINEERING, DATE, PHONE, FAX - Self-explanatory.
 - c. APPROVED - Self-explanatory.
 - d. CONDITIONALLY APPROVED - "Approved subject to incorporation of comments:".
 - e. DISAPPROVED - "Disapproved for the following reasons:".
 - f. COMMENTS ON ATTACHED CONTINUATION PAGE(S) - Self-explanatory.
 10. Continuation page - Follow instruction #5 and number the page.

FIGURE 4-1 (3 of 3)

The alteration identified below, and attached, has been classified as:

_____ Mandatory – Now: Cranes are to be removed from service until alteration is complete.

_____ Mandatory – Delayed: Alteration will be accomplished during the next () Type A () Type B () Type C inspection per NAVFAC P-307 or within _____ days.

_____ Mandatory – When Needed: Alteration will correct a deficiency when the deficiency occurs.

_____ Mandatory – Site Specific: Approved as a unique alteration for an activity or particular crane.

ACTIVITY	ORIGINAL ALTERATION NUMBER
ALTERATION TITLE	ALTERATION ORIGINALLY LOCALLY APPROVED () SUBMITTED FOR NCC APPROVAL ()

CAPACITY / TYPE	MANUFACTURER	SPS ()
		GPS ()

ASSEMBLY	SUB-ASSEMBLY	COMPONENT	PART
----------	--------------	-----------	------

COMNAVSEASYS COM CONCURRENCE: Received _____ N/A _____

CONFIGURATION MANAGER	DATE	PHONE	FAX
		DSN 443-0505 (610) 595-0505	(610) 595-0749
DIRECTOR IN-SERVICE ENGINEERING	DATE	PHONE	FAX
		DSN 492-6329 (757) 492-6329	(610) 595-0749

WHEN THE ALTERATION IS COMPLETED, A COPY OF THIS FORM SHALL BE RETURNED TO THE CRANE CENTER WITH THE FOLLOWING INFORMATION:

DISTRIBUTION

SECTION 9 OPERATOR CHECKS

9.1 Pre-Use Check (Category 1, 2, and 4 Cranes and Cab Operated Category 3 Cranes). A complete check of the crane shall be performed by the operator prior to the first use of the crane each day. A Crane Operator's Daily Checklist (ODCL) shall be used for this purpose. The operator shall sign the ODCL at the completion of the check. Subsequent operators shall review the initial ODCL, shall perform the operational checks of paragraph 9.1.2.1.4 (except that the boom hoist limit switches need not be checked), and shall sign the initial ODCL. The ODCL shall be turned in to the supervisor after the last use of the crane each day. The only exception to completion of the appropriate check prior to making a lift is when a load is suspended from the hook for a period that spans more than one operator and the lift cannot be practically or safely interrupted. In those instances, the appropriate check shall be performed immediately upon completion of the lift, unless the equipment will not be operated again by that operator. For operations not involving a lift (e.g., moving the crane to a new location), the operator shall check those functions applicable to the operation to be performed.

9.1.1 Documentation. Figure 9-1 identifies attributes applicable to most types of cranes. If a crane is equipped with load bearing or load controlling parts or safety devices not shown in figure 9-1, they shall be included in the activity's ODCL. Shortened forms, customized to particular categories of cranes, may be used provided they include all attributes applicable to the particular cranes covered.

9.1.2 Procedure. The operator shall check the items prescribed on the checklist. It is not the intent of this paragraph to require checking and test of those items that would require additional personnel (such as electricians) or additional equipment (such as man lifts or fall protection equipment) or safety lockouts. The operator's check shall also include operating the machine without load through all motions; using all controls through a range sufficient to ensure their proper operation; and verifying the proper operation of safety devices, gauges, meters, warning signals, limit switches, and other devices.

9.1.2.1 Specific Instructions. The pre-use check is in four parts and is designed to group the items to be checked in their normal sequence of location or area as they would normally be observed. All items and attributes are keyed to the ODCL. The condition observed shall be indicated on the form. The operator may perform the check from the various groupings in parallel.

9.1.2.1.1 Walk Around Check. The operator shall perform an "on the crane" walk-around check on those cranes equipped with a safe access means. For category 1 and 4 cranes, the walk around check shall be from the ground, inside the machinery house if applicable, the operator's cab, and the walkways and ladders between the ground, machinery house, and operator's cab. The boom may remain in its normal operating range. It is not intended that the boom and A-frame be climbed. For category 2 and cab operated category 3 cranes with access ladders and walkways, the check shall be from the ground, the walkways, and the cab. The operator shall ensure the crane is

currently certified. Enter the certification expiration date on the ODCL. If the crane is not currently certified, this condition shall be reported to the supervisor. The check shall include walking around and/or over the exterior of the crane observing anything that is out of order or place. As a minimum, the operator shall observe and report the condition of the following:

- a. Safety Guards and Plates. Check for missing safety guards and plates.
- b. Carrier Frame and Rotate Base. Check carrier frame and rotate base thoroughly for obvious physical damage, such as cracking, bending, or deformation of plates or welds. Check for cracking or flaking of paint that may indicate a crack or damage in the structure beneath. Check hook rollers, bull gear, and rotate pinion.
- c. General Hardware. Check for missing and loose hardware (bolts, nuts, brackets, etc.).
- d. Wire Rope. Check wire rope for unusual wear, fraying, birdcaging, corrosion, and kinking. Check end connections where visible, particularly wedge sockets for proper configuration, seating, and condition of wire rope. Check chafing blocks for adequate guidance of lines and excessive wear.
- e. Reeving. Check for condition of wire rope reeving. Ensure wire rope fleet angle has not caused overriding of drum flange. Check to ensure wire rope is running true in hook block and boom point sheaves. Check to ensure wire rope is laying correctly on the drum.
- f. Block. Check condition of block and ensure all swivels rotate freely.
- g. Hook. Check condition of hook for cracks, excessive throat opening, or twist.
- h. Sheaves. Check, where practical, condition of sheaves to determine that they are free to rotate and are not cracked or chipped.
- i. Boom and Jib. Check condition of boom and jib for straightness and any evidence of physical damage, such as cracking, bending, or other deformation of the steel elements or welds. When checking lattice booms, be especially watchful for bent lattices and dents in the main chords.
- j. Gantry, Pendants, and Boom Stops. Check condition of gantry, pendants, and boom stops. Check gantry for distortion or other damage. Check boom pendants for sags or other evidence of unequal length and that the anchor pins are set. Check boom stops to ensure they are not damaged and telescoping struts are not jammed.
- k. Walkways, Ladders, and Handrails. Check condition of walkways, ladders, and handrails. Look for loose mountings, cracks, excessive rust, loose rungs, or any other signs of unsafe conditions.
- l. Windlocks, Stops, and Bumpers. Check for free action of windlocks. Check stops and bumpers on the crane for cracks or other damage.

m. Tires, Wheels, and Tracks. Check condition of tires for inflation, serious cuts, or excessive wear. If lifts on rubber are planned, check tire with gage for proper inflation pressure per OEM load chart. Check wheels to ensure they are not loose or damaged. On track machines, look for excessive slack, broken or loose pads, or any other obvious defects.

n. Leaks. Check for evidence on machine frame and on ground beneath machine, of any leakage of fuel, lubricating oil, hydraulic fluid, or engine coolant.

o. Outriggers and Stabilizers. Check outriggers and stabilizers for damage. If floats or pads are not permanently installed on the outrigger, ensure they are on the carrier and that they are not damaged.

p. Load Chain. Check for damaged or deteriorated links.

q. Area Safety. Check work area and ensure that exact locations of obstacles or hazards are known. Ensure ground conditions are sufficiently firm to support a loaded crane. Verify temporary connections are removed or cleared for operation (e.g., temporary shore power or hotel power).

9.1.2.1.2 Machinery House Check. Enter machinery house and/or remove machinery inspection panels or covers observing the following:

a. Housekeeping. Check to ensure the machinery house and accesses are clean. Ensure tools and authorized materials are properly stored and that waste and debris are removed.

b. Diesel Engine and Generator. Check diesel engine lube oil level, radiator coolant level, hydraulic oil level, and fuel level. Check fan and drive belts for damage. Check for evidence of loose fasteners, oil or grease splashes, and any indications of overheating.

c. Leaks. Check for leaks of lubricating oil, fuel, grease, hydraulic oil, or coolant.

d. Lubrication. Check gear cases for lubricant level and evidence of over or under lubrication of crane components.

e. Battery. Check for excessive corrosion and leakage.

f. Lights. Check that machinery house lights are working.

g. Glass. Check for broken or missing glass in machinery house doors or windows.

h. Clutches and Brakes. Check accessible portions of clutches and brakes for evidence of excessive heat, wear, or grease and oil on the linings. Check for evidence of loose fasteners and for missing or broken parts. If a brake is

equipped with a manual release mechanism, check to ensure the mechanism is not in the released position.

i. Electric Motors. Check all motors for evidence of loose fasteners, oil or grease splashes, and any indications of overheating.

j. Auxiliary Engine and Compressor. Check lube oil level, radiator coolant level, hydraulic oil level, and fuel level. Check fan and drive belts for damage. Check for evidence of loose fasteners, oil or grease splashes, and any indication of overheating.

k. Danger/Caution Tags. If danger or caution tags are posted, read, understand, and follow the directions on the tags.

l. Fire Extinguishers. Ensure fire extinguishers are in place, seals are unbroken, and inspection tags are up to date.

m. Hoist Drum Pawls and Ratchets. Check locking pawls and ratchets, where visible, for damage, alignment and proper engagement.

9.1.2.1.3 Operator Cab Check. Enter cab and ensure all controls are in the neutral or off position before starting engine. Start engine and check the following:

(Note: Specific sequence will vary with type of crane.)

a. Gauges. Check gauges to ensure none are broken or missing and that they are operating normally.

b. Indicator and Warning Lights. Check indicator and warning lights to ensure none are broken or missing and that applicable indicator and warning lights are lit.

c. Visibility. Check visibility to ensure that all windows and mirrors are clean, unbroken, and that any vandal guards have been removed from windows.

d. Load Rating Charts. Ensure that load rating charts are posted in the operator's cab and that they are legible.

e. List and Trim Indicator (Floating Cranes). Check list and trim indicator to ensure crane is level within tolerances. Ensure both list and trim bubble tubes are in their respective holders and not broken.

f. Boom Angle/Radius Indicator. Check indicator(s) for damage and ensure linkages are connected. When electronic indicators are used, ensure power is supplied.

g. Fire Extinguisher. Ensure fire extinguishers are in place, seals are unbroken, and inspection tags are up to date.

h. Level Indicator (Mobile Cranes). Check level indicator for damage.

i. Danger/Caution Tags. If danger or caution tags are posted, read, understand, and follow the directions on the tags.

9.1.2.1.4 Operational Check. Warm up engine. When ready to perform operational check, alert rigger and perform the following:

a. Area Safety. Check work area and ensure that exact locations of obstacles or hazards are known. Ensure ground conditions are sufficiently firm to support a loaded crane.

b. Outriggers and Stabilizers. Prior to initial set up, check outriggers and stabilizers to ensure they function freely.

c. Unusual Noises. After starting engine, be alert for unusual noises, fluid leaks, improper functioning, incorrect readings of gauges, and loss of power or bad response to control of the engines or motors.

d. Control Action. Check controls through a range sufficient to ensure that they operate freely and that the corresponding component actuates properly when controls are activated. Check hoist controls through full speed range.

e. Wire Rope. While lowering the hooks and the boom for limit switch tests and hook inspections, observe sections of wire rope that may not be visible during the walk around check.

f. Brakes and Clutches. Check brake and clutch actions and ensure they are functioning normally and that there is no slippage, excessive play, or binding. Exercise brakes and clutches to ensure they are dry.

g. Boom Angle/Radius Indicator. Check operation of boom angle and/or radius indicator.

h. Limit Switches. Checking of limit switches shall include each upper hook hoist primary limit switch and the upper and lower boom hoist primary limit switches. (Verifying the operation of the upper and lower boom hoist limit switches is required only during the initial check of the crane each day.) Checking of hook hoist lower limit switches is not required if the hook can be lowered to its lowest possible position (e.g., bottom of drydock being worked at minimum radius) while still maintaining a minimum of two wraps of rope on the hoist drum (three wraps for ungrooved drums). For cranes that do not have the requisite number of wraps, the hook hoist lower limit switch shall be checked where operationally possible, i.e., if the crane is at a location where the limit switch can be checked (where the lower limit switch is not checked during the pre-use check, it shall be checked if the crane is subsequently relocated to a position where it can be checked).

Checking of secondary limit switches is not required unless a specific operation is planned where the primary limit switch will be bypassed. (See section 10 for controlling the bypassing of safety devices.)

i. Emergency Stop (e.g., Power-Off Button). Check the emergency stop. Know its location and ensure it is working properly. (Not applicable to diesel engine shutdowns on portal and floating cranes.)

j. Other Operational Safety Devices. Check any other operational safety devices as directed by the activity engineering organization.

k. General Safety Devices. Check general safety devices and ensure they are functioning.

l. Fleeting Sheaves. Check operation of fleeting sheaves, where visible, to ensure they travel freely on the shaft.

9.2 Pre-Use Check (Non-Cab Operated Category 3 Cranes)

a. For all cranes, the user shop shall have the responsibility for pre-use checks, the safe and proper operation of assigned cranes, and reporting problems to the crane inspection organization.

b. For bridge, wall, and gantry cranes, a documented pre-use check shall be performed at least once each calendar month the crane is in use. The pre-use check shall be in accordance with paragraph 9.1.2, except that the pre-use check may be from the ground. The checklist shall be completed and signed by a qualified operator. The operator shall forward the checklist to his/her supervisor for review. (Note: For cranes idle for more than 6 months, a condition inspection is required prior to use. See section 3.)

9.3 Operator-Detected Deficiencies

9.3.1 Load Bearing Parts, Load Controlling Parts, and Operational Safety Devices. When an operator, during the daily check of equipment or during operation, observes a deficiency of a load bearing part, load controlling part, or operational safety device (e.g., an asterisked item on the ODCL); or an operating condition that could result in uncontrolled movement, failure to move as expected from a control input, or otherwise render the crane unsafe, he/she shall immediately secure the crane from further operation and notify the supervisor of the deficiency observed. This includes leaks with greater than normal seepage. The supervisor shall immediately report the crane deficiency to the crane inspection organization for diagnosis of the deficiency and initiation of corrective repair action, including engineering resolution as necessary. The crane (or affected hoist on cranes with multiple hoists) shall not be returned to service until such deficiencies are either corrected or evaluated by the activity engineering organization as satisfactory for continued operation. See sections 2 and 3 for requirements for repair, inspection, and certification. The items shall be marked as unsatisfactory. A note in the remarks block shall identify the specific component and

describe the unsatisfactory condition. In the case of a known (and tagged) deficiency, the operator shall mark the appropriate block on the ODCL (e.g., "Electric Motors" for an inoperative portal crane travel motor; "Operation" for an out of service hoist) as unsatisfactory and explain in the remarks block that the crane has been determined satisfactory for operation with the restrictions noted. In such cases, the operator would not need to contact his supervisor.

9.3.2 Other Deficiencies. For any other deficiency noted on the ODCL, the item shall be marked as unsatisfactory and the operator shall describe the deficiency in the remarks block. The operator's supervisor shall provide the ODCL to the organization responsible for corrective action. For non-cab operated category 3 cranes, the activity shall prescribe procedures for notification and corrective action.

CRANE OPERATOR'S DAILY CHECK LIST

CRANE NO.	TYPE/CAPACITY	LOCATION	CERTIFICATION EXPIRATION DATE	SHIFT			HRS OPERATED	DATE
				1	2	3		
<p align="center">OPERATORS</p> <p align="center">LEGEND U = UNSATISFACTORY NA = NOT APPLICABLE</p>								
<p align="center">1 WALK AROUND CHECK</p>								
a	Safety Guards and Plates	S	U	NA				
b	Carrier Frame and Rotate Base	*						
c	General Hardware							
d	Wire Rope	*						
e	Reeving	*						
f	Block	*						
g	Hook	*						
h	Sheaves	*						
i	Boom and Jib	*						
j	Gantry, Pendants, and Boom Stops	*						
k	Walkways, Ladders, and Handrails							
l	Windlocks, Stops, and Bumpers							
m	Tires, Wheels and Tracks							
n	Leaks							
o	Outriggers and Stabilizers	*						
p	Load Chain	*						
q	Area Safety	*						
<p align="center">2 MACHINERY HOUSE CHECK</p>								
a	Housekeeping	S	U	NA				
b	Diesel Engine and Generator	*						
c	Leaks							
d	Lubrication							
e	Battery							
f	Lights							
g	Glass							
h	Clutches and Brakes	*						
i	Electric Motors	*						
j	Auxiliary Engine and Compressor							
k	Danger/ Caution Tags	*						
l	Fire Extinguishers							
m	Hoist Drum Pawls and Ratchets	*						
<p align="center">3 OPERATOR CAB CHECK</p>								
a	Gauges	S	U	NA				
b	Indicator and Warning Lights							
c	Visibility	*						
d	Load Rating Charts	*						
e	List/Trim Indicator (Floating Cranes)	*						
f	Boom Angle/Radius Indicator	*						
g	Fire Extinguisher							
h	Level Indicator (Mobile Cranes)	*						
i	Danger/ Caution Tags	*						
<p align="center">4 OPERATIONAL CHECK</p>								
a	Area Safety							
b	Outriggers and Stabilizers	*						
c	Unusual Noises							
d	Control Action	*						
e	Wire Rope	*						
f	Brakes and Clutches	*						
g	Boom Angle/Radius Indicator	*						
h	Limit Switches	*						
i	Emergency Stop	*						
j	Other Operational Safety Devices							
k	General Safety Devices							
l	Fleeting Sheaves							
<p align="center">INSTRUCTIONS - Check all applicable items indicated, each shift. Suspend all operations immediately when observing an unsatisfactory condition of any item indicated with an asterisk (*) unless the condition has been reviewed and continued operation has been authorized by the activity engineering organization. In addition, suspend operation when any unsafe condition is observed and immediately notify supervisor. For any unsatisfactory item, identify the specific component and describe the deficiency in the "Remarks" block.</p>								
FIRST OPERATOR'S SIGNATURE				OPERATOR'S SIGNATURE				DATE
DATE				DATE				DATE
REMARKS								

FIGURE 9-1

that if the communication ceases, the operator shall stop operation until communication is reestablished.

Note: The operator shall stop the crane at any time and in any situation judged to be unsafe. In addition, the operator shall immediately respond to a direction from any person to stop his/her crane.

10.7 General Operating Precautions. In all operations, the crane operator shall remain alert because the person directing the operation may not see all hazards. The operator shall remain alert to obstructions, people, and the behavior and feel of the machine. Never allow unauthorized personnel in, on, or around the machine when in operation. Dress appropriately, wearing prescribed safety gear. Do not expose any parts of the body to moving machinery.

The operator shall remain at the controls at all times while a load is suspended from the crane. This does not include slings and other gear used to rig the load. Activities shall assess all potential hazards prior to leaving rigging gear on an unattended crane, such as exposure to personnel, weather conditions, proximity of the crane or gear to obstructions, and potential for collisions. Additionally, any gear left on the crane shall not prevent the performance of the operator's pre-use check when required. Loads shall not be suspended or moved over personnel. When it is necessary, personnel may reach under suspended loads for a short duration to install/remove coverings, make attachments, position supports, etc., provided the load is not suspended over the employee's head and the only body parts under the load are the arms up to the elbows. Any reaching under the load shall be approved by the rigger-in-charge. The load shall not be in motion while the employee is reaching under the load. Activities shall minimize the occurrence of reaching under suspended loads.

Initiate and maintain all crane movements slowly and smoothly watching boom movement to prevent boom "kickback". Eliminate rapid acceleration and braking. These actions put dangerous impact loads on the machine and its components. Speed may be hazardous and it reduces the chance to take corrective action. With a loaded wire rope suspended boom or jib close to boom stops, never rapidly relieve boom of load. Wire ropes stretch when loaded and spring back when load is suddenly removed. This can cause boom to kick back into boom stops and damage the boom. In this situation, both the boom hoist and the hook hoist shall be used in setting down the load. Use power lowering whenever possible.

10.7.1 Electromagnetic Interference Susceptibility. Electronic equipment on cranes, including control systems and load indicating devices, may be susceptible to electromagnetic interference (EMI), especially when operating near ships' radar or other radio transmitting sources. Activities need to be aware of the EMI environment in the vicinity of crane operations and assess the impact of such environment on potentially susceptible equipment.

10.8 Lifting of Personnel. The lifting of personnel by crane shall only be accomplished when no safer method is available. When lifting personnel, the following requirements apply: (For naval shipyards, refer to the NAVSEA Crane Quality Manual.)

- a. This is a complex lift as defined above. Each activity shall have written procedures that conform to these requirements. The activity safety office shall approve these procedures.

b. Cranes, rigging gear, and personnel platforms shall conform to OSHA (29 CFR 1926.550g) requirements.

c. A body harness and shock absorbing lanyard shall be worn and attached to the lower load block or to a structural member within the personnel platform capable of supporting the impact from a fall. The harness and anchorage system shall conform to OSHA requirements.

10.8.1 Personnel Platform Loading. The personnel platform shall not be loaded in excess of its rated load capacity. The number of persons occupying the personnel platform shall not exceed the number required for the work being performed. Personnel platforms shall be used only for personnel, their tools, and the materials necessary to do their work and shall not be used to hoist materials or tools when not hoisting personnel. Materials and tools for use during a personnel lift shall be secured to prevent displacement and shall be evenly distributed within the confines of the platform while the platform is suspended.

10.8.2 Operation. Hoisting of the personnel platform shall be performed in a slow, controlled, cautious manner with no sudden movements of the crane or derrick. Operation shall be accomplished using one crane function at a time. Load and boom hoist drum brakes, swing brakes, and locking devices such as pawls or dogs shall be engaged when the occupied personnel platform is in a stationary position. The crane shall be uniformly level within one percent of level grade and located on firm footing. Cranes equipped with outriggers shall have them all fully deployed following OEM's specifications, insofar as applicable, when hoisting personnel. The total weight of the loaded personnel platform and related rigging shall not exceed 50 percent of the rated capacity for the radius and configuration of the crane or derrick. Lift and lowering speeds shall not exceed 100 feet per minute.

10.8.2.1 Trial Lift. A trial lift with the unoccupied personnel platform loaded to the anticipated weight to be lifted shall be made from ground level, or any other location where personnel will enter the platform to each location at which the personnel platform is to be hoisted and positioned. This trial lift shall be performed immediately prior to placing personnel on the platform. The operator shall determine that all systems, controls and safety devices are activated and functioning properly; that no interference exists; and that all configurations necessary to reach those work locations will allow the operator to remain under the 50 percent limit of the hoist's rated capacity. A single trial lift may be performed at one time for all locations that are to be reached from a single set up position. For mobile cranes, the trial lift shall be repeated prior to hoisting personnel whenever the crane is moved and set up in a new location or returned to a previously used location. Additionally, the trial lift shall be repeated when the lift route is changed unless the operator determines that the route change is not significant (i.e., the route change would not affect the safety of hoisted personnel). After the trial lift, and just prior to hoisting personnel, the platform shall be hoisted a few inches and inspected to ensure that it is secure and properly balanced. Personnel shall not be hoisted unless the following conditions exist: Hoist ropes shall be free of kinks, multiple

corrosion (sufficient to cause an orange peel texture after cleaning). Special care shall be taken to check high wear areas of shackles, links, and rings (e.g. center of the shackle bail and pin). Inspect for such conditions as nicks, cracks, gouges, or peening. Cracks shall be removed. Other conditions shall be removed or, for questionable conditions, referred to the activity engineering organization for resolution. Where the component shows evidence of burning or welding, or is visibly bent, spread, twisted, or otherwise distorted, it shall be removed from service and destroyed. Components with damaged threads shall be referred to the activity engineering organization for resolution. The component shall be rejected where normal wear results in a reduction of the cross sectional dimension of any part exceeding the following:

- a. Shackle bows and welded links - 10 percent of the nominal diameter shown in Federal Specification RR-C-271. For sizes not shown in Federal Specification RR-C-271, the OEM's listed nominal dimensions shall be used.
- b. Shackle pins, swivels, rings, and weldless links - five percent of the nominal diameter shown in Federal Specification RR-C-271. For sizes not shown in Federal Specification RR-C-271, the OEM's listed nominal dimensions shall be used.
- c. Eye bolts - five percent of the OEM's nominal eye section diameter.
- d. Turnbuckle end fittings - five percent of the nominal diameter shown in ASTM F1145.
- e. Hooks - 10 percent of the OEM's nominal dimensions.
- f. Swivel Hoist Rings - five percent of the OEM's nominal dimensions.

14.7.1.1 OEM Markings. Equipment lacking the OEM identifying mark shall not be used in weight handling operations. See paragraph 14.3 for re-marking of equipment with worn or hard to read markings.

14.7.2 Repairs. Grinding, to remove defects, shall be the only method used to repair rigging gear. Grinding shall follow the contour of the piece, blending with a maximum 1:3 (i.e., maximum rise to run) taper. Dimensions after grinding shall be within the wear limits for the piece being repaired. Grinding to remove defects on areas of a shackle pin where fit-up is critical (e.g., area of shackle pin that contacts roller bearing on dynamometers) is prohibited. Removal of cracks shall be verified by nondestructive test as described in appendix E paragraph 1.4.3 for crane hooks. Removal of defects as specified will not require a load test. Correction of defects by use of heat or welding is not permitted. No attempt shall be made to straighten bent or twisted rigging gear.

14.7.3 Use Criteria for Shackles, Links, and Rings. Shackles, links, and rings shall be selected for the direct tension they will see rather than the weight of the load. In some cases, the tension of one leg of a lift could exceed the weight of the load. Special care shall be used in selecting shackles to be used in multiple leg applications. Different types, grades, or brands of shackles of the same rated load may vary significantly in

MECHANICAL SPLICE. A loop or eye formed in the end of a wire rope (either turn-back or flemish eye) with one or more metal sleeves pressed or swaged over the wire rope junction.

MESSENGER TRACK. A horizontal member, mounted along a handrail or girder, supporting movable carriers from which festooned wires are hung.

MODIFICATION. See alteration.

MULTI-PART SLING. A sling with more than one component rope in the body. The component ropes may be cable laid or braided.

NON-INTEGRAL ATTACHMENTS. Removable attachments (eye bolts, bolted lifting lugs, etc.)

NOTCH. Movement across or to mechanical notches that indicates by feel of the master switch handle the various speed points and that automatically centers the handle at the contact points.

OEM. The original equipment manufacturer or a company that has obtained the rights to the equipment design or manufacture.

OPERATOR'S CAB. The operator's compartment from which movements of the crane are controlled. May be specified as open, having only sides or a railing around the operator, or enclosed, complete with roof, windows, etc.

OUTRIGGERS. Extendable or fixed members attached to the mounting base, that rest on supports at the outer ends used to support the crane. Outriggers are capable of supporting the entire weight of the crane and load.

OVERHEAD ELECTRIC TRAVELING CRANE. An electrically operated machine for lifting, lowering and transporting loads, consisting of a movable bridge carrying a fixed or movable hoisting mechanism and traveling on an overhead runway structure.

OVERLOAD PROTECTION (OVERCURRENT). A device operative on excessive current to cause and maintain the interruption or reduction of current flow to the equipment governed.

OVERLOAD. Any load greater than the rated load.

PACKAGE HOIST. A commercially designed and mass-produced hoist characterized by the motor, gearing, brake(s), and drum contained in a single package often connected by the use of c, d, or p-face flanges. This is in contrast to a "built-up" hoist, which utilizes separate motors, gearboxes, brakes, and drum typically connected by couplings.

PADEYE. A portable or fixed eye secured to structural members used for attachment of rigging gear.

PARKING BRAKE. A friction brake for a bridge or trolley, automatically applied when power to the crane is interrupted.

PAWL. A gear locking device.

MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 1 CRANES

SHEET 2 OF

Crane

Item No	Inspection Type			Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
	A	B	C				S	U	C	NA
11		X	X	Gauges (Oil, Fuel, Temperature, Ammeter, Tachometer, Etc.)	Inspect for identification, legibility, and condition. Inspect for evidence of loose electrical or mechanical connections. Verify operation (calibration not required).					
12		X	X	Turbocharger	Inspect for evidence of loose or missing mounting bolts and parts. During operation, inspect for vibration and oil leaks. Listen for abnormal noise.					
13		X	X	Governor	Inspect linkage for evidence of binding, looseness, and damaged parts. Inspect for proper oil level. Verify proper operation.					
14	X	X	X	Fuel Filters	Inspect for leaks prior to and during operation.					
15	X	X	X	Air Cleaner	Inspect mounting brackets for evidence of loose or missing fasteners. Inspect for proper oil level and condition of filter element or vacuum indicator.					
16		X	X	Throttle Linkage	Inspect for evidence of loose and damaged components. Verify proper operation.					
17		X	X	Clutch-Main Drive	Inspect linkage for damage, for evidence of binding, loose and worn components, and for proper lubrication and adjustment. During operation, inspect for slippage and evidence of binding. Listen for abnormal noise.					
-----	-----	-----	X	-----	At every second "C" inspection, disassemble and inspect all internal components. Note: Does not apply to chassis drive clutches.	-----	-----	-----	-----	-----
18		X	X	Exhaust System	Inspect for holes, for damaged gaskets, for evidence of loose or missing fasteners, and for proper insulation. During operation, inspect for leaks and sparks. Listen for abnormal noise.					
19	X	X	X	Engine Condition	During operation, inspect for excessive smoking and vibration. Listen for abnormal noise.					
20		X	X	Engine Alarm Safety Devices	Inspect wiring for damage or deterioration, and for evidence of loose connections. Verify proper operation of engine overspeed, oil system, and water system shutdown and/or alarm systems by testing with sensors installed where practical. If sensor removal is necessary for shop testing or calibration, reinstallation and inspection shall be per controlled procedures approved by the activity engineering organization.					
21			X	Heat Exchanger	Inspect for oil and water leaks, and for evidence of loose or missing fasteners. During operation, verify operation of temperature gauges.					
22			X	Fuel Tank	Inspect fuel tank for leaks, for condition of gauge, and for evidence of loose or missing fasteners. Inspect fuel strainers and filters. Inspect for proper venting.					
23	X	X	X	Clutches (Boom, Hoist, Swing, and Travel)	Inspect clutch linkage for damage, for evidence of binding and loose or worn components, and for proper lubrication and adjustment. Inspect clutch linings for wear, and drums for smoothness and for evidence of overheating. During operation, inspect for slippage and evidence of binding. Listen for abnormal noise.					

MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 1 CRANES

SHEET 5 OF

Crane

Item No	Inspection Type			Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
	A	B	C				S	U	C	NA
27 b cont		X	X	Brake Disassembly	Disassemble as required to inspect brake linings for wear or glazing or for damaged brake discs, splines, or other internal components. For hoist brakes that stop the movement of the load under normal operation conditions, this shall be done annually. For other hoist brakes (i.e., holding brakes) and for rotate and travel brakes, disassemble as required at every second "C" inspection.					
28		X	X	Shafts and Couplings	Inspect for damage, for leaking seals, and for evidence of loose keys, coupling bolts, and covers. During operation, inspect for vibration and other evidence of misalignment or damaged components. Listen for abnormal noise. Inspect for evidence of bearing damage, overheating, and abnormal wear.					
		X	X	Boom, Hoist, and Single Rotate Drives-Initial Inspection	Verify coupling alignments are within OEM tolerances (not applicable to NEMA c, d, and p-face motors). Coupling alignment verifications shall be completed by June 2001.					
			X	Boom, Hoist, and Single Rotate Drives-Subsequent Inspections	After initial verification, verify alignment at every second "C" inspection. Coupling alignment verification data shall be filed in the crane's history file.					
29 a		X	X	Gearing (Boom, Hoist, Rotate, Travel) External Gears	Inspect for damaged or worn gears, for evidence of misalignment or loose keys, and for proper lubrication. During operation, listen for abnormal noise, and inspect for other evidence of possible damage.					
29 b		X	X	Gearing (Boom, Hoist, Rotate, Travel) Internal Gears	Inspect for proper gear case lubricant level. Inspect for leaks and for evidence of loose or missing mounting fasteners. Inspect breathers for restrictions. During operation, and inspect for vibration, overheating, and other evidence of damaged internal components or misalignment. Listen for abnormal noise. Inspect for evidence of bearing damage, overheating, and abnormal wear.					
		X	X	Internal Gears for Boom, Hoist, and Single Rotate Drives. (Not applicable to hydraulic mobile cranes.)	Monitor using an oil or vibration analysis program. The oil or vibration analysis shall be performed at least once each certification period with results analyzed by a qualified source. The results of the analysis shall be documented and retained in the equipment history file for the life of the component					

MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 1 CRANES

SHEET 6 OF

Crane: _____

Item No	Inspection Type			Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
	A	B	C				S	U	C	NA
29 b cont			X	Internal Gears for Boom, Hoist, and Single Rotate Drives- Alternate (Not applicable to hydraulic mobile cranes.)	As an alternative to oil or vibration analysis, internal gears shall be visually inspected for wear or damage and for evidence of misalignment. If all gears can not be visually inspected through inspection ports or by video probe or similar inspection devices, the gear cases shall be disassembled for visual inspection. If this alternative is selected, initial inspections shall be completed by June 2001 with subsequent inspections at every third "C" inspection. For a crane less than nine years old, the initial inspection may be delayed until its third "C" inspection after initially placed in service. Document the results in equipment history file.					
30			X	Chains and Sprockets	Inspect chains for proper tension and lubrication, and for evidence of loose or worn links and pins. Inspect sprockets for worn or damaged teeth, for evidence of loose shafts and keys, and for proper lubrication. During operation, listen for abnormal noise.					
31	X	X	X	Pawls, Ratchets, and Rotate Locks	Inspect for evidence of loose, damaged, or worn components. Inspect operating system for evidence of worn keys, loose fasteners, and broken springs. Operate pawls and rotate locks and inspect for proper setting. Verify limit switch and indicator light operation.					
32		X	X	Air Compressor	Inspect for cleanliness, for evidence of loose or missing mounting fasteners, for proper belt tension and wear, and for condition of filters. During operation, verify proper operation of unloader valve and pressure switch. Listen for abnormal noise and inspect for vibration.					
33	X	X	X	Pressure Vessel Inspection Certificate	Verify that pressure vessel inspection certificate is properly posted and current. (See NAVFAC MO-324 or appropriate document for test procedure).					
34		X	X	Air Control System	Inspect valves, cylinders, lines, regulators, and gauges for damage or deterioration, and for evidence of loose or missing fasteners. During operation, inspect system for leaks, and verify proper operation of valves, regulators, and gauges.					
35		X	X	Hydraulic System	Inspect hydraulic system components, including motors, pumps, valves, cylinders, lines, regulators, and gauges for damage or deterioration, and for evidence of loose or missing fasteners. Inspect reservoir for proper fluid level. During operation, inspect system for leaks, and verify proper operation of motors, pumps, valves, cylinders, regulators, and gauges.					
36			X	Wheels and Axles	Inspect wheels for uneven wear, flat spots, chips, flange wear, and cracks, for evidence of loose or missing fasteners and bearing caps, and for proper lubrication. During operation, inspect for excessive movement between components, improper tracking, overheating, and other evidence of component wear or bearing damage. Listen for abnormal noise.					

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD

FOR CATEGORY 2 AND 3 CRANES SHEET 2 OF

Crane	Type	Manufacturer	Capacity
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Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
8 b	Gearing (Hoist, Rotate, Travel) Internal Gears (Including Clutches)	<p>Inspect gear case for proper lubricant level. Inspect for leaks and for evidence of loose or missing fasteners. Inspect breathers for restrictions. During operation, inspect for vibration, overheating, and other evidence of misaligned, worn, or damaged internal components or bearings. Listen for abnormal noise.</p>					
	Hoist Gears. (Not applicable to category 3 package hoist assemblies.)	<p>Additionally, internal gearing for hoists shall be monitored by an oil or vibration analysis program. The oil or vibration analysis shall be performed at least once each certification period with results analyzed by a qualified source and documented and retained in the equipment history file for the life of the component.</p> <p>As an alternative to oil or vibration analysis, internal gears shall be visually inspected for wear or damage and for evidence of misalignment. If all gears can not be visually inspected through inspection ports or by video probe or similar inspection devices, gear cases shall be disassembled for visual inspection. If this alternative is selected, initial inspections shall be completed by June 2001 with subsequent inspections at every tenth annual inspection. For a crane less than ten years old, the initial inspection may be delayed until its tenth annual inspection after initially placed in service</p>					
8 c	Gearing (Hoist) Manually Operated Chain Hoists.	<p>Inspect for evidence of worn, corroded, cracked, or distorted parts such as shafts, gears, bearings, pins, rollers, load sprockets, idler sprockets, or hand chain wheels.</p> <p>Manually operated chain hoist gears shall be visually inspected annually unless they are in the biennial program, in which case they shall be inspected every two years.</p>					
9	Mechanical Load Brakes	<p>Inspect for proper lubrication and level and for leaks. During operation, inspect for chattering, vibration, overheating, or other evidence of misaligned, worn, or damaged internal components. Listen for abnormal noise.</p>					
10	Mechanical Brakes	<p>Inspect system for damage, for evidence of binding, loose, and worn components, and for proper lubrication. Disassemble as required to inspect brake linings for wear and glazing, and drums for smoothness and for evidence of overheating. Inspect brakes for proper settings and for alignment of brake shoes. During operation, verify proper release, engagement, and stopping action in both directions of motion. Inspect for evidence of overheating.</p> <p>Note: For hoist brakes that stop the movement of the load under normal operating conditions, disassembly, as required, shall be done annually, except that disassembly of brakes on cranes in the biennial program may be done biennially in conjunction with the load test. For other hoist brakes (i.e., holding brakes) and for rotate and travel brakes, disassemble as required at every sixth annual inspection.</p>					

1.4.2 Hook Throat Spread. Hooks shall be measured for hook throat spread before and after load test. A throat dimension base measurement shall be established by installing two tram points and measuring the distance between these tram points. This base dimension shall be retained in the equipment history file for the life of the hook. The distance between tram points shall be measured before and after load test. Hooks showing an increase in the throat opening by more than five percent from the base measurement shall be discarded.

1.4.3 Hook Disassembly, Inspection, and Nondestructive Test (NDT). In conjunction with the hook NDT, the hook, retaining nut or eye pin (and swivel eye bar as applicable), and bearings shall be disassembled from the block and thoroughly inspected. The hook and retaining nut shall be visually inspected for thread wear and all components shall be inspected for corrosion damage. Block bearing plates shall be visually inspected for cracks, wear, or other damage. Bearings shall be inspected for evidence of unusual wear and free rotation. All components shall be lubricated as required during assembly.

The entire hook and retaining nut or eye pin (and swivel eye bar as applicable) shall be NDT'd for defects. NDT shall be magnetic particle method in accordance with ASTM A 275 or NAVSEA Technical Publication T9074-AS-GIB-010/271. Automatic powder blowers or any other form of forced air other than from a hand-held bulb shall not be used for the application or removal of dry magnetic particles. For hooks of non-magnetic material, NDT shall be liquid penetrant (LP) method in accordance with ASTM E 1417 or T9074-AS-GIB-010/271. For LP testing of hooks containing stainless steels, titanium, or nickel-based alloys, total halogens, and sulphur used in the NDT process must be controlled as specified in T9074-AS-GIB-010/271. If NDT cannot be performed on surfaces inside holes, those surfaces shall be visually inspected to the maximum extent practical. Acceptance criterion shall be no linear indications greater than 1/16 inch. NDT shall be performed prior to load tests. An NDT of a crane hook is valid for six annual certification periods.

1.4.4 NDT Quality Assurance Requirements. Navy activities with established NDT quality assurance programs that meet NAVSEA, NAVAIR, Fleet (or equivalent) quality program requirements should be used as sources for NDT to the maximum extent practical. If a commercial NDT vendor is used for NDT, the following requirements apply:

- a. The vendor shall provide a certification that the vendor meets the requirements of ASTM E 543. The certification shall be provided annually as a minimum.
- b. The vendor shall develop, and submit for review, procedures, including technique sheets specific to the types, shapes, and sizes of the parts being examined (e.g., shank hook, eye hook, duplex hook, eye bar, nut). For the magnetic particle method, the procedures shall adequately describe the orientation of the hook, nut, or pin with the magnetizing equipment. A Level III examiner who is independent of the vendor and is certified in the applicable NDT method shall review these procedures. Activities that do not staff NDT personnel may utilize another Navy activity or other Government organization, such as the Defense Contract Management Agency or Supervisor of Shipbuilding, for this review on a cost reimbursable basis.

c. Vendor certifications and approved procedures shall be retained on file for the life of the NDT period.

1.4.5 Hook Identification. Each hook and nut or eye pin (and swivel eye bar as applicable) shall be uniquely identified with some type of permanent marking in order to provide a positive traceability to the NDT report. The marking on the hook shall be visible with the hook installed on the crane. Where possible, the marking on the other components shall be visible with the hook installed on the crane.

1.5 Inspection and Testing of Insulated Links

1.5.1 General Inspection. Ensure link surface is clean and that no conductive material exists on the outer surface of the link such as graphite grease, metallic particles, or rust streaks. Check for obvious mechanical damage. Minor nicks, cuts, tears or abrasions are acceptable on the outer cover.

1.5.2 Link Identification. Each link shall be uniquely identified with some type of permanent marking to provide positive traceability to its base tram measurement and NDT report.

1.5.3 Dimensional Inspection. Establish tram points across the dielectric structure of the link and measure base tram reading before initial installation of the link. Measure

the distance between the tram points before and after the load test. Compare the measurement to the base tram measurement. Reject link if measurement exceeds the base tram measurement by more than one percent.

1.5.4 Link Disassembly, and Nondestructive Test (NDT). Disassemble the link, connecting stud(s), hook, and nut in conjunction with hook disassembly. Perform a visual inspection of the metal link ends for thread damage, wear, and corrosion. Apply a temporary sealing tape over the threaded holes to prevent moisture entry into the link during the disassembled period. Perform a magnetic particle inspection of the stud and nut in accordance with ASTM A 275 or NAVSEA Technical Publication T9074-AS-GIB-010/271. Acceptance criterion shall be no linear indications greater than 1/16th inch. The NDT quality assurance requirements noted above for hooks apply.

1.5.5 Electrical Test. After reassembly of the link on the crane, and at every annual certification, apply a minimum of 10,000 volts across the insulated link and measure leakage current. Leakage shall not exceed 70 microamps per 1,000 volts.

1.6 Prerequisites to Load Testing

1.6.1 Test Area. A safe test area shall be selected and all traffic and unauthorized personnel and equipment shall be cleared from test area. This test area shall be roped off or otherwise secured to prevent entry of unauthorized personnel and equipment.

1.6.2 Rigging. Rigging gear shall conform to the requirements of section 14.

1.6.3 Crane Track. Crane track to be used during crane load tests shall be certified per NAVFACINST 11230.1. If the crane load test is also the load test for track certification, the track shall be given a control inspection prior to load testing and shall have no catastrophic defects as defined by NAVFACINST 11230.1.

1.7 Precautions During Load Testing. Prescribed tests are overload tests and extreme caution shall be observed at all times. Personnel shall remain clear of suspended loads and areas where they could be struck in the event of boom failure. The test load shall be raised only to a height sufficient to perform the test.

1.7.1 Test Speeds. During tests, normal operating speeds shall be employed. Rated speeds in accordance with specifications need not be attained. Emphasis shall be placed on the ability to safely control loads through all motions at normal speeds.

1.8 Duplex (Sister) Hook with Hole for Shackle Pin. For crane hooks with a hole used for lifting, both the hook barbs and the lifting hole shall be load tested. As a minimum, a ten-minute static test shall be completed. For similar crane attachments (in lieu of hooks) with holes for attachment, a ten-minute static test shall be completed for each hole. The requirements of paragraph 1.4 2 (Hook Throat Spread) do not apply to the lifting hole.

lowering of the test load, which may indicate malfunction of boom or hoisting components or holding brakes. If either hoist has primary and secondary holding brakes (i.e., where each brake is designed to individually hold the load), then the following tests shall be performed, for each applicable hoist, in lieu of the single 10 minute holding test noted above:

(1) Raise the test load approximately one foot and hold open one of the brakes. Hold the load for 10 minutes and observe for lowering of the load, which may indicate malfunction of hoisting components or brake.

(2) Reset the brake held open and open the first brake tested. Again hold the load for 10 minutes observing for malfunctions. Reset the brake and verify the proper timing sequence of the setting of the brakes.

(3) If the brakes are designed to individually hold only the rated capacity (and not 125 percent), then the tests in subparagraphs (1) and (2) may be performed with a test load of 100 (+5/-0) percent of rated capacity and the certification shall be so noted. However, the brakes, acting together, shall demonstrate the ability to hold a 125 percent test load for a 10 minute period.

b. Hoist Dynamic Test. Raise and lower the test load and visually observe smooth control between points. Stop the load during hoisting and lowering to verify the brake stops and holds the load. Check for proper operation of dynamic braking.

CAUTION: Dynamic braking will not stop motion.

c. Wire Rope Test for New Rope. The maximum working length of new wire rope shall be tested before being put in service. This shall be accomplished during either the static or dynamic test. (For cranes servicing drydocks, this will require lifting the test load into or out of the deepest drydock available for the main hoist test.)

d. Boom Hoist Operating Test. Starting from maximum radius and with the load attached, raise the boom to minimum radius. Lower the boom to maximum radius. Visually observe for smooth motion between boom controller points. Stop the hoist during hoisting and lowering to verify the brake stops and holds the load. Check for proper operation of dynamic braking.

e. Hoist Foot Brake Test (Hydraulic or Mechanical). Lower test load, using first control point, then apply the foot brake. This shall stop the lowering motion of the test load.

CAUTION: Not applicable to load-sensitive reactor type hoist controls.

f. Boom Foot Brake Test (Hydraulic or Mechanical). Start with boom near maximum radius and with the test load approximately two feet from the ground surface. Lower test load using the first control point of the boom hoist. Apply the foot brake. This shall stop the lowering motion of the boom and test load.

lowering of the load, which may occur, that may indicate malfunction of hoisting components or holding brakes. If the hoist has primary and secondary holding brakes, then the tests noted in subparagraphs 2.2.3.a (1), (2) and or (3), shall be performed in lieu of the 10 minute holding test noted above.

b. Dynamic Test. Raise and lower test load and visually observe smooth control between points. Stop the load during hoisting and lowering to verify the brake stops and holds the load. Check for proper operation of dynamic braking.

c. Wire Rope Test for New Rope. The maximum working length of new wire rope shall be tested before being put in service. This shall be accomplished during either the static or dynamic test. (For cranes servicing drydocks, this will require lifting the test load into or out of the deepest drydock available.)

d. Foot Brake Test (Hydraulic or Mechanical). Lower test load using first control point, then apply the foot brake. This shall stop the lowering motion of the test load.

CAUTION: Not applicable to load-sensitive reactor type hoist controls.

e. Loss of Power (Panic Test). This test is designed to test the reaction of the hoisting unit in the event of power failure during a lift. Hoist the test load approximately 10 feet above the ground. Lower test load at slow speed and with the controller in the slow lowering position, disconnect the main power source by pushing the main power stop button or buttons, then return the controller to the neutral position. The test load shall stop lowering when the controller is placed in the neutral position.

CAUTION: This test shall not be performed on cranes that do not have powered down hoists. Additionally, the activity engineering organization shall review the system circuitry for cranes with electronic controls to assure that this test can be performed safely without damaging the control system. For assistance in the circuitry review, contact the Navy Crane Center.

2.2.4.1 Emergency Brake on Wire Rope Drum (Shaft Failure Detection System)

a. Static Test. Test the ability of the hoist caliper disc brake to hold the test load after testing the other holding brake(s). Raise the test load approximately one foot off the ground. Do not engage the boom hoist pawl (if applicable). Depress the emergency stop pushbutton to disconnect the main power source and set the brakes. Manually release all brakes except the caliper disc brake. Hold the load for 10 minutes with the caliper disc brake. Observe for lowering of the load, which may indicate a malfunction of the hoisting components or the brake. Reset the other holding brake(s) to the applied condition. Energize the main power source. Verify that the load is held by the holding brake(s). Operate the hoist in each direction and verify proper operation of all controls and brakes.

b. Dynamic Test. Perform with a test load of 100 (+0/-5) percent of rated capacity. Raise the load to a sufficient height to perform the following test. Lower the load at a slow speed (first speed point or minimum speed). Disable all hoist brakes except the wire rope drum brake and simulate a system fault by interrupting (e.g., test switch) the motor or drum encoder. The brake shall stop the load. Reset all brakes. (CAUTION: Station appropriately trained personnel at each disabled hoist brake in case of failure of the drum brake to stop the load. These personnel shall be in constant contact with the load test director and prepared to safely engage the hoist brakes when directed.)

CAUTION: The activity engineering organization shall review the system circuitry for cranes with electronic controls to assure that this test can be performed safely without damaging the control system. For assistance in the review, contact the Navy Crane Center.

2.2.5 Whip Hoist. Maximum test load for the hoist.

a. Static Test. Raise test load to clear ground and hold for 10 minutes. Rotate load and hook to check operation of bearing. Observe for lowering of the load, which may indicate malfunction of hoisting components or holding brakes. If the hoist has primary and secondary holding brakes, the tests noted in subparagraphs 2.2.3.a.(1), (2), and/or (3) shall be performed in lieu of the 10 minute holding test noted above.

b. Dynamic Test. Raise and lower test load and visually observe smooth control between points. Stop the load during hoisting and lowering to verify the brake stops and holds the load. Check for proper operation of dynamic braking.

c. Wire Rope Test for New Rope. The maximum working length of new wire rope shall be tested before being put in service. This shall be accomplished during either the static or dynamic test. (For cranes servicing drydocks, this will require lifting the test load into or out of the deepest drydock available.)

d. Foot Brake Test (Hydraulic or Mechanical). Lower test load using first control point, then apply the foot brake. This shall stop the lowering motion of the test load.

CAUTION: Not applicable to load-sensitive reactor type hoist controls.

e. Loss of Power (Panic Test). This test is designed to test the reaction of a hoisting unit in the event of power failure during a lift. Hoist the test load approximately 10 feet above the ground. Lower test load at slow speed and, with the controller in the slow lowering position, disconnect the main power source by pushing the main power stop button, then return the controller to the neutral position. The test load shall stop lowering when the controller is placed in the neutral position.

2.3.2 Static Test. Raise test load to clear ground and hold for 10 minutes with boom at maximum radius. Do not engage boom or load hoist pawl (dog). Observe for lowering of the load, which may indicate malfunction of hoisting components or brakes.

2.3.3 Dynamic Test. Raise and lower test load and visually observe smooth control between points. Stop the load during hoisting and lowering to verify the brake stops and holds the load.

2.3.4 Boom Hoist Operating Test. Starting from maximum radius and with the load attached, raise the boom to the maximum radius for the next higher load using all controller points. Lower the boom through all controller points. Visually observe for smooth motion between controller points. Stop the hoist during hoisting and lowering to verify the brake stops and holds the load.

2.3.5 Boom Foot Brake Test (Hydraulic or Mechanical). Start with boom near maximum radius, and with the test load approximately two feet from the ground surface, lower test load, using first control point of the boom hoist. Apply the foot brake. This shall stop the lowering motion of the boom and test load.

CAUTION: Not applicable to load-sensitive reactor type hoist controls.

2.3.6 Automatic Boom Brake (Where applicable, i.e., Washington Crane Company). This brake is to prevent a "free fall" boom in case of failure of clutch, boom hoist control, and foot brake. With the test load approximately four inches above the ground, set the brake firmly. Release the mechanical boom dog. Release the boom clutch by operating the boom hoist control. Slowly release the foot brake to the free position. Hold the test load with automatic brake for five minutes then lower test load by applying the boom hoist clutch and lowering with the controller operation.

2.3.7 Rotation. Start with boom at maximum radius, rotate left and right 360 degrees. However, if test area will not permit, two complete revolutions of the swing pinion are considered adequate. Test loads for floating cranes can be rotated over the water.

CAUTION: Exercise care when rotating loads over water. Ensure during the initial load test the floating crane has adequate draft readings per design data.

2.4 Additional Tests for Dravo 60-Ton Floating Cranes. (Perform these tests in conjunction with the other load tests). These tests verify the proper operability of the pneumatic clutch system and the back up (emergency) brake system in case of failure in the clutch system.

4. For cranes equipped with outrigger locking devices but where activity operating procedures permit operation without the use of the locking devices, this test shall be performed over both sides of the crane with the locking devices disengaged.

5.5.2 Stability Test

Note: The test load shall be established based on the boom length and radius determined below.

- a. Boom Operation. Raise and lower the boom through the full working range for the length of boom extended and radius as determined below. Visually observe for smooth operation. Test boom brake for proper operation.
- b. Rotation. At slow speed, rotate left and right maximum degrees allowed by the OEM at the radius as determined below. Apply brake periodically during rotation. Brake shall demonstrate its ability to stop the rotating motion in a smooth, positive manner. Where brakes are designed for holding only, operate controls by plugging to stop rotation then apply brake. For cranes with outrigger locking devices and where such devices are used in operation, this test shall be performed with the locking devices engaged. For cranes with front outriggers/stabilizers, stop rotation with the boom over the front outrigger/stabilizer and hold the load for 10 minutes. There shall be no significant lowering of the outrigger/stabilizer.

Notes:

1. These tests shall be done over the side of the crane. Stability testing of mobile cranes can be extremely hazardous, particularly with long booms and with jibs attached. To minimize the hazard, perform the tests in the following configurations:

- a. For telescoping boom cranes, these tests shall be performed with the boom extended approximately halfway between fully retracted and fully extended. (For example, if a boom has a retracted length of 40 feet and ratings for eight feet increments of extension to a fully extended length of 96 feet, the mid point between fully retracted and fully extended is 68 feet. Since this length is not on the load chart, test the crane with a boom length of 64 or 72 feet.) However, if the rated load for maximum radius for that boom length is not governed by stability (e.g., below the bold line) select the first longer increment of boom length where stability governs. If no ratings are governed by stability, perform the test with the maximum boom length. Perform the test at the maximum radius for the boom length selected. However, see note b below.

- b. For all cranes test at maximum radius (for the boom length selected - see subparagraph a above) except if the weight of deductions for equipment on the crane (hook block, jib, etc.) exceeds the weight of the test weights hanging from the hook, then test at a radius (in the stability range of the crane) where the weight of the test weights hanging from the hook are equal to or greater than the weight of the deductions. For example, for a crane with configuration deductions (load block, jib, hook, etc.) of 6,000 pounds, test at a radius where the weight of the test weights hanging from the hook will be at least 6,000 pounds.
2. When lifting test loads, always lift the load well within the maximum radius and slowly boom down to the pre-measured radius (as determined above) stopping at least once to test the effectiveness of the boom brake. Lift the test load only high enough to perform the required tests.
3. A crane outrigger may become light (start to raise up within the outrigger pad) and the outrigger pad may clear the ground during this procedure (with the boom positioned over the opposite corner) depending on the make and model. Generally, this is normal and not an indication of tipping. However, the activity shall verify with the crane OEM that a crane exhibiting this condition is safe for use.

5.5.3 Auxiliary and Whip Hoist. Test load shall be based on the maximum rated capacity for the hoist to be tested. For telescoping boom cranes, tests shall be performed with the boom fully extended or until 3 wraps of wire rope remain on the hoist drum.

- a. Static Test. Raise the test load to clear the ground and hold for 10 minutes. Observe for any lowering that may occur, which may indicate a malfunction of hoisting components or brakes.
- b. Dynamic Test. Raise and lower the test load at normal operating speeds.
- c. Hoist Brake. Test the ability of the brake to control and stop the load. Test the ability of the brake to hold and lower the test load with the friction clutch disengaged, if applicable.

5.5.4 Ancillary Equipment. For cranes that will use ancillary equipment or alternate configurations (swing-away jibs, power pinned fly sections, manual extensions, jibs at variable offsets) using ancillary equipment procedures per section 3, load tests are required. Test load shall be based on the maximum rated load for the equipment or as limited by wire rope line pull if the equipment is not fully reeved. For jibs with variable offset angles, test at the greatest offset used. Record each test configuration and test load on the certification supplement form, figure 3-2.

Notes:

1. For multiple boom sections installed in lattice boom cranes, testing of all possible boom insert combinations is not required. Perform a static and dynamic load test at the maximum and minimum boom lengths anticipated for use during the certification period.
2. For multiple reeving configurations testing of all possible reeving configurations is not required. Perform a static and dynamic load test for both an even and odd number of line parts (if both an even and odd number of line parts are to be used during the certification period) using a test load and reeving configuration that produces the maximum allowable line pull for the wire rope.
3. For cranes that will be re-reeved to use alternate hook block(s), static and dynamic load tests, at the maximum capacity the block(s) will be used, are required for each hook block and dead end connection to be used.

5.5.5 Free Rated Load Test. Check the stability and operation of crane, carrier, wheels, tires, tracks, brakes, etc., under load by performing the following tests, when lifting without outriggers and/or traveling with the load are permitted at the activity for the type of crane being tested.

CAUTION: Ensure all "on rubber" lifting requirements established by the OEM are complied with. Attach taglines to the load to control oscillation. For cranes with outriggers, extend outriggers and maintain minimal clearance (3 to 4 inches) above ground. Test personnel shall stand clear of tires during load tests.

Notes: No static test is required. Not applicable to mobile cranes temporarily mounted on barges. Some cranes have different ratings for stationary lifts and for traveling with a load. Each allowable configuration shall be tested. See section 11, for allowable free rated capacities. Because capacities for over the side lifting are limited to 60 percent of OEM capacities, testing over the side is not required.

a. **Maximum Free Rated Load.** Hoist maximum free rated test load at minimum possible radius over the rear (or over the front as required by the OEM). Slowly boom down to the maximum radius for the load.

(1) Rotate through the appropriate working arc.

(2) Travel a minimum of 50 feet with test load over the rear (or front as required by the OEM) with the boom parallel to the longitudinal axis of the crane carrier.

b. **Stability Test.** Repeat step "a" with a test load corresponding to the radii determined as follows: For telescoping boom cranes, test with the boom approximately halfway between fully retracted and fully extended but do not exceed OEM's boom length limitation for lifting on rubber. Test at the maximum radius for the boom length selected. For cranes with fixed length booms, see paragraph 5.5.2 for determination of radius. If no ratings are governed by stability, no stability test is required.

CAUTION: When lifting test loads, always lift the load well within the maximum radius and slowly boom down to a pre-measured radius. Lift the test load only high enough to perform the required tests.

5.5.6 Test After Change or Repair of Tires. (For cranes with "on rubber" lift capability and for articulating boom cranes). After change or repair of tires, the crane shall be traveled (with no load on hook) a minimum of 100 feet, forward and reverse, with the counterweight positioned over the corner of the crane with the affected tire, with the boom at minimum radius or as required by the OEM.

5.6 Articulating Boom Crane. Follow the requirements of paragraphs 5.1 and 5.3, and perform a no-load test in accordance with paragraph 5.4 as applicable. Definitions and nomenclature are extracted from ASME B30.22, Articulating Boom Cranes.

5.6.1 Maximum Test Load for the Outer Hook or Padeye

CAUTION: Lift the test load only high enough to perform the required tests.

a. **Static Test.** Raise the test load to clear the ground with boom sections at the minimum allowable articulating angle, (typically inner boom and secondary boom in a straight line for a 0 degrees articulation angle) and at the minimum possible radius for the load and hold for ten minutes. Rotate load and hook to check bearing operation, if applicable. Observe for any lowering that may occur, which may indicate a malfunction of boom or hoisting components, brakes, or outriggers/stabilizers. Tests 5.6.1.a through d shall be performed with any manual or hydraulic telescoping boom sections fully retracted.

Note: The length of the test pendants and safety of the lift will govern the actual minimum test radius. Use extreme caution when lifting load for cranes that have no winch (wire rope hoist) to maintain load within radius. See note under 5.5.1.a for winch, if applicable.

b. **Dynamic Test.** Raise and lower the test load at normal operating speeds using the winch if so equipped. Test the ability of the winch brake and controls to control and stop the load. If the crane is not equipped with a winch skip this step.

c. **Boom Operation.** Using the inner and secondary boom lift cylinders, operate the boom from minimum radius to maximum radius for the load applied. Repeat the test in the opposite direction.

d. **Hydraulic Component Slippage For Cranes Equipped With Hydraulic Extension (Telescoping) Cylinders.** Lift the test load inside the maximum radius and allow time for fluid and component temperatures to stabilize. Hold the load for ten minutes without use of controls by the operator. There shall be no

significant lowering of the load, boom, or outrigger/stabilizer beams due to components or systems malfunction or failure during the test.

Notes for Hydraulic Component Slippage Test:

1. For cranes without lockable outriggers/stabilizers, or for cranes with lockable outriggers/stabilizers where the activity allows operation without the use of the locking devices, one of the above tests shall be performed on the opposite side of the crane (and over the front for cranes with front outriggers).
2. The significance of any lowering shall be evaluated by the activity engineering organization depending on operating requirements and safety.

Notes for Stability Test:

1. These tests shall be performed over the side of the crane. Stability testing can be extremely hazardous, particularly with long booms. To minimize the hazard, perform the test in the following configurations:
2. If no ratings are governed by stability, perform the above tests with the boom at the maximum hydraulically extended boom length (for cranes equipped with hydraulic extension cylinders), minimum articulation angles, and maximum allowable radius as determined by the posted load chart (typically “straight out”). If some load chart ratings are governed by stability, perform the test with the boom positioned at the first boom length governed by stability, minimum articulation angle, and maximum allowable radius and load for that boom length.
3. When lifting test loads, always lift the load well within the maximum radius and slowly boom down to the pre-measured radius (as determined above) stopping at least once to test the effectiveness of the boom hydraulic system to control the load. Lift the test load only high enough to perform the required tests.
4. A crane outrigger/stabilizer may become light (start to raise up within the outrigger/stabilizer pad) and the outrigger/stabilizer pad may clear the ground during this procedure (with the boom positioned over the opposite corner) depending on the make and model. Generally, this is normal and not an indication of tipping. However, the activity shall verify with the crane OEM that a crane exhibiting this condition is safe for use.

5.6.3 Maximum Test Load for the Inner Hook or Padeye. If crane is equipped with an inner hook or padeye that is utilized by the activity perform the test required by paragraph 5.6.1.a and c, on the inner hook or padeye.

5.6.4 Ancillary Equipment. When authorized, ancillary equipment (manual extensions, etc.) shall be load tested. Test load shall be based on the maximum rated load for the equipment, or as limited by wire rope line pull if the equipment is not fully reeved. Record each test configuration and test load on the certification supplement form, figure 3-2.

5.7 Weight Handling Equipment Used for Other than Lift Crane Service. Locomotive, crawler, truck, and cruiser cranes that are used for clamshell, dragline, magnet, pile driving, or other non-lift crane work shall be tested at the maximum safe working load permitted for the size wire rope being used. This test shall be performed in all working motions except travel. Buckets, magnets, etc., may be removed for testing wire rope. No test is required after reassembly. Retesting is not required when end attachment is changed from original connection (i.e., changed from clamshell use to dragline and so on) during the certification period.

6 Bridge/Overhead Traveling, Wall, Gantry, Cantilever Gantry and Semi-gantry

6.1 No-Load Test

6.1.1 Hoist

- a. Raise each load hook slowly into the hoist limit switch.
- b. Check for proper operation of the backup limit switch (where applicable).
- c. Lower and raise each hook through all controller points.
- d. Check for proper operation of lower limit switch (where applicable).

6.1.1.1 Emergency Brake on Wire Rope Drum (Shaft Failure Detection System). Simulate a system fault by disconnecting the motor encoder signal while lowering at slow speed. Verify that the brake applies and that the hoist control is disabled in each direction. Reconnect the encoder after the test. Repeat this test with the drum encoder.

6.1.2 Trolley. Operate the trolley through all controller points in both directions. Operate the full distance of the bridge rails and verify proper brake operations.

6.1.3 Bridge. Operate the bridge travel controller through all points in both directions. Operate the full distance of the runway and slowly contact the runway rail stops with the crane bridge bumpers. Verify proper brake operation during this test.

APPENDIX O
NAVY CRANE CENTER POLICY AND
GUIDANCE FOR CRANE ALTERATION REQUESTS

1. The Navy Crane Center (NCC) will review CAR's identified as urgent by the activity on a highest priority basis.
2. The scope of NCC reviews will be limited to the specific subject of the submitted request. When a peripheral non-compliance or unsafe condition is noted, NCC will address it as an advisory comment to the activity.
3. Appropriate activity industrial process instructions will be accepted where applicable.
4. Fatigue shall be analytically addressed in requests dealing with new shafts or other components subject to fatigue. For shafts, the analysis shall be performed in accordance with ANSI/ASME B106.1M, Design of Transmission Shafting.
5. CAR's addressing shaft misalignment shall show parallel and angular alignment measurements and measurement techniques to be utilized for the measurements. The coupling OEM's initial, running, and ultimate alignment tolerances, as well as details of alignment securing features such as shear bars, pins, bolts, etc. shall also be shown.
6. CAR's addressing components that experience lateral or shear loads designed to be resisted by shear bars shall include calculations and installation procedures demonstrating design assumptions are satisfied.
7. Replacement of brake components with OEM's approved equivalent or optional components (such as stiffer springs) shall be handled as a locally approved CAR. Introduction of non-standard components shall be approved by NCC.
8. CAR's are not required and should not be submitted for complex lift procedures, maintenance operations, and OEM's optional crane configuration changes.
9. CAR's intended for application to a number of cranes must designate those cranes by their unique identification numbers in addition to capacity/type and OEM. Designations such as "general" and "various" shall not be used.
10. When a discrepancy between the design and the as-built condition for a load bearing or load controlling part or an operational safety device is discovered, the activity engineering organization and the NCC shall first evaluate the condition. If the decision is to retain the as-built condition, a CAR titled "Documentation (as-built variance)" is required. If the design is determined correct and the decision is to reconfigure the crane to the designed condition, no CAR is required.

11. NCC reviews locally approved CAR's submitted for information. These CAR's will be processed as follows:

a. Locally approved CAR's with significant errors or deficiencies will be over-stamped "Returned with Comments" and returned. Any further action on returned CAR's will be at the discretion of the local activity. If a corrected/revised CAR is resubmitted, it should be identified by revision letter "A" or the next sequential letter after the previous revision.

b. NCC use of the "Reclassified" designation will be limited to those CAR's that, according to section 4, were improperly locally approved.

12. Copies of CAR forms, standing crane alterations, and quarterly crane alteration summary reports are available from NCC.

25. U.S. Department of Transportation, Federal Highway Administration, Motor Carrier Safety Regulation, 49 Code of Federal Regulations, Part 391 Sections 41-43, "Physical Qualifications and Examinations."
26. ASME B18.15, "Forged Eyebolts," B30.2 through B30.11, B30.16, B30.17, and B30.20 through B30.22, "Safety Standards for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings," American Society of Mechanical Engineers, New York, NY.
27. ASTM A 275, "Magnetic Particle Inspection of Steel Forgings," E 543, "Standard Practice for Agencies Performing Nondestructive Testing," E 1417, "Standard Practice for Liquid Penetrant Examination," F 1145, "Standard Specification for Turnbuckles, Swaged, Welded, Forged," American Society for Testing and Materials, West Conshohocken, PA.
28. SAE J765, *Crane Load Stability Test Code*, Society of Automotive Engineers, Inc., Warrendale, PA.
29. OCPM Instruction 12792.3, *Department of the Navy Drug Free Workplace Program*, Department of the Navy, Office of Civilian Personnel Management, Washington, D.C.
30. MIL-STD-1625, *Safety Certification Program for Drydocking Facilities and Shipbuilding Ways for U. S. Navy Ships*, Naval Sea Systems Command, Washington, D.C.